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AMTID

APPLICATION OF MODERN TECHNOLOGY
TO INTERNATIONAL DEVELOPMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT
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AID-OST-80-1

ENERGY CONVERSION FROM SOLID WASTE

Solid Waste: A New Natural Resource

May '71, 18 pp. English
PB 211 256 **PC A02/MF A01**

An experimental program is described for converting municipal refuse into fuel gas of high thermal efficiency using the fluidized bed pyrolysis process. The process uses fluidized sand in the absence of oxygen to produce fuel gas. A short description of a pilot test is given.

Synthetic Fuel Production from Solid Wastes

Sept. '77, 87 pp. English
PB 272 423/5 **PC A05/MF A01**

Potential catalysts for commercial gasification of chars produced by the pyrolysis of municipal or industrial wastes are evaluated. Also covered are the potential for synthetic fuel production from solid wastes and the feasibility of providing the heat required for the gasification reactions. It is concluded that a feasible, economically attractive system is possible.

Anaerobic Digestion of Solid Waste and Sewage Sludge to Methane

July '75, 17 pp. English
PB 261 091/3 **PC A02/MF A01**

This report evaluates the potential for processing organic wastes (solid waste and sewage sludge) using a controlled anaerobic digestion method to produce methane.

Feasibility Study: Conversion of Solid Waste to Methanol or Ammonia

Sept. '74, 357 pp. English
PB 255 449/1 **PC A16/MF A01**

This report examines a method of processing solid waste into industrial grade methanol (methyl alcohol) or anhydrous ammonia. Technical assessment of waste conversion, product uses, markets, and financial analysis are covered.

Markets and Technology for Recovering Energy from Solid Waste

1974, 37 pp. English
PB 252 326/3 **PC A03/MF A01**

This paper explores the major characteristics of energy products that can be recovered from solid waste, the marketability of these products, and the status of the technology for recovery. The first section considers fuels—solid, liquid, and gaseous—that can be created out of solid waste. The second section examines steam and electricity, and the final section compares various systems and energy products.

This edition of AMTID marks the second in a long series of guest editorship issues planned for the upcoming year. Ing. Bogaert de Perez from INDOTEC in the Dominican Republic, a member of the USAID Technical Information Network, has edited this month's issue.

Dear Friend,

The problem of energy shortage is worldwide, but in underdeveloped countries like ours its effects are felt with greater intensity.

The Dominican Institute of Industrial Technology (INDOTEC) is a member of the National Commission of Energy Policy, whose main objective is the implementation of a national energy program to help decrease the external dependence of our country in this field, as well as to contribute to the transfer, application, improvement, and development of a non-conventional energy technology by means of scientific and technological research.

Due to this, and the interest shown by the customers of our Center of Scientific and Technological information, and to the importance of energy reports for projects which could partially solve the problem of pollution and energy shortage, we have chosen for this AMTID issue a group of documents concerning the production of synthetic fuels from waste products.

We hope that the information contained in these reports will be useful for the users who are continuously interested in the subject of energy.

Sincerely,

Jeanne B. de Pérez

Ing. Jeanne Bogaert de Perez
INDOTEC, Dominican Republic

Conversion of Solid Waste to Fuels

Jan. '76, 34 pp. English
AD-A021 655/6 **PC A03/MF A01**

Economic and practical methods for recovering energy from solid waste were studied. Two promising fuels were identified—polymer gasoline and methanol. A nominal 10-pound-per-hour pyrolysis system was constructed and tested. Preliminary cost analyses and studies of the effects of population and energy market value on fuel costs were also conducted.

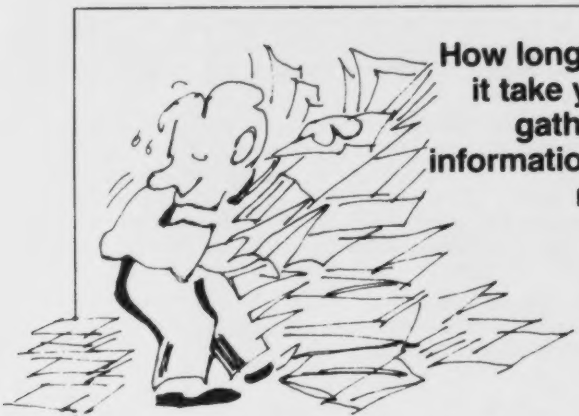
Conversion of Municipal and Industrial Refuse Into Useful Materials by Pyrolysis

Aug. '70, 18 pp. English
PB 194 946 **PC A02/MF A01**

Pyrolysis (destructive distillation) techniques developed to determine the yield and quality of coal products are used to convert municipal and industrial refuse into useful solids, liquids, and gases without adding to environment pollution. The tests demonstrated that a ton of municipal refuse can be converted into 154 to 424 pounds of solid residue, 0.5 to 6 gallons of tar, 1 to 4 gallons of light oil, 97 to 133 gallons of liquor, 16 to 32 pounds of ammonium sulfate, and 7,380 to 18,058 cubic feet of gas. A ton of industrial refuse, consisting of paper, rags, and cardboard, can be converted to 618 to 838 pounds of residue, 1.5 to 3 gallons of light oil, 68 to 75 gallons of liquor, 12 to 23 pounds of ammonium sulfate, and 9,270 to 14,065 cubic feet of gas. The energy from the gas is more than sufficient to provide the heat for the pyrolysis.

Production of Methane from Refuse and Sewage Sludge
Mar. '73, 9 pp. English
PB 220 821/3 **PC A02/MF A01**

Waste disposal is rapidly becoming a major problem of developing nations, coupled with a worldwide energy shortage. New technology sources must be developed to deal with these problems. Recent research has explored converting municipal wastes to high BTU gas. Included in these efforts is anaerobic conversion of waste materials to methane-containing gas, since both sewage sludge and municipal refuse contain methane-producing anaerobic bacteria.



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Both PC and MF have corresponding codes which can be found on the ordering page in Price Schedule A.

Fuels from Municipal Refuse for Utilities: Technology Assessment
Mar. '75, 184 pp. English
PB 242 413/3 **PC A09/MF A01**

This report presents the results of a study which surveyed technologies of fuel production from municipal solid wastes (MSW) for use by electric utility companies.

Production of Gaseous Fuel by Pyrolysis of Municipal Solid Waste
Mar. '75, 65 pp. English
N75-24105/9 **PC A04/MF A01**

Pilot plant tests were conducted on a mixture of shredded newspaper, wood waste, polyethylene plastics, crushed glass, steel turnings, and water. Tests were conducted at 1400 F in a lead-bath pyrolyser. About 80 percent of the organic content was converted to gases. The system was shown to require minimal preprocessing and less sorting than other methods.

Biomass Fuel Systems: Directory of Sources and Potential Users
Aug. '78, 103 pp. English
HCP/T4101-04 **PC A06/MF A01**

Sources and potential users of technical information on biomass fuel systems are identified. Organizations and individual contacts are listed in various production and conversion categories.

Fast Production of Methane by Anaerobic Digestion. Progress Report
Feb. '78, 40 pp. English
COO-2900-13 **PC A03/MF A01**

Gas-producing methanogens are sensitive to environmental change. A procedure has been developed for determining relative rate coefficients where thermodynamic variables such as temperature, pressure, ionic strength, and loading are maintained constant. Preliminary data on the rate of disappearance of volatile acids shows that production of gases is strongly dependent upon mixing speed in the 50 to 150 rpm range. Comprehensive tables on the comparative daily performance of the digesting systems are presented.

ALTERNATIVE SOURCES OF ENERGY FOR DEVELOPING COUNTRIES

An Overview of Alternative Energy Sources for LDCs
Aug. '74, 372 pp. English
PB 239 465 **PC A16/MF A01**

Alternative energy sources can be valuable to lesser developed countries in adjusting to the impact of sharply higher world market prices of petroleum. This review of non-conventional energy technologies provides a country-by-country summary of current economic posture and energy resources in 15 LDCs.

Conversion of Waste Organic Material to Gasoline
1976, 7 pp. English
COO-2982-7 **PC A02/MF A01**

A development project to convert organic waste material to gasoline is described. The method is based on the Fischer-Tropsch synthesis of straight-chain hydrocarbons from pyrolysis gas and then reforming the hydrocarbons into gasoline. The concept appears technically feasible and implementation on a large scale will depend on refinements in performance and demonstrated operational reliability.

Reclamation of Energy from Organic Waste
Mar. '74, 143 pp. English
PB 231 176/9 **PC A07/MF A01**

This study uses the anaerobic fermentation process to produce methane from organic urban refuse. The quantity and quality of gas produced, the rate of gas production, the solids reduction, nutritional requirements, and operating problems were evaluated in a laboratory system operating at temperatures ranging from 35 C to 60 C. The results of the laboratory study include data on capital and operating costs of refuse shredding, refuse separation, reactor volume, reactor mixing, reactor heating, and residue dewatering.

Contribution to the Analysis of the Development of Unconventional Energy Sources in Latin America
Apr. '77, 32 pp. English
ERDA-TR-298 **PC A03/MF A01**

The energy demand for Latin America will be satisfied through use of its conventional hydraulic and fossil resources. Nuclear energy will experience a great development in Argentina, Brazil, and Mexico in the coming 20 years. The electronuclear alternative in other Latin American countries will depend on the degree of industrialization, geographic location, and the possibilities for interconnecting networks to transmit and distribute electrical energy. The development of wind energy, thermal gradient of the ocean, solar energy, geothermal energy, and tidal power as energy sources is discussed.

Technology for the Conversion of Solar Energy to Fuel Gas Quarterly Report No. 3
Oct. '73, 145 pp. English
PB 241 055/3 **PC A07/MF A01**

Methods for the economic production of methane gas by the anaerobic digestion of organic matter is discussed. The organic matter is derived from the conversion of solar energy to plant material via photosynthesis. An initial source of feed material is available in the form of organic solid wastes, the byproducts of food, feed, and wood production. The converting of waste materials to fuel gas by anaerobic digestion represents a potential solution to the energy problem, and to the problem of solid wastes.

Technology for the Conversion of Solar Energy to Fuel Gas. Annual Report
Jan. '74, 153 pp. English
PB 238 103/6 **PC A08/MF A01**

Methane formation by biological conversion of organic materials is examined. The materials exposed to the anaerobic fermentation process include paper, grass, household garbage, fresh water algae, water hyacinth, seaweed, cattle manure, dry manure, and dry dog food. During operation of the digester, the amount and composition (methane and carbon dioxide) of the gases produced by the fermentation were determined and chemical analyses of the composition of the liquid contents in the digesters were carried out.

Siting Handbook for Small Wind Energy Conversion Systems
May '78, 118 pp. English
PNL-2521 **PC A06/MF A01**

This handbook provides guidelines for people considering using small wind energy conversion systems. The handbook is published in its current form to provide basic strategies to users as early as possible.

APPROPRIATE TECHNOLOGY FOR RURAL DEVELOPMENT

LIME AND ALTERNATIVE CEMENTS

1974; 174 pp. English

This very useful report contains information describing alternative cements that can be used for construction materials. The alternative materials are proposed to maximize the use of local skills and resources and to minimize the importation of skills or goods. The papers discuss the cements, the manufacturing methods, and some new applications for using the end product. This publication can be ordered by requesting:

PB 297 680 PC A08/MF A01

Solar Space Heaters for Low-Income Families
Sept. '78, 29 pp. English
PB 289 244/6 **PC A03/MF A01**

The manual will guide individuals in constructing and installing low-cost window-box solar collectors. Included are explanations of solar collector fundamentals, lists of construction and installation materials and tools, step-by-step procedures for building and installing a unit, and an intensive bibliography of information on home weatherization and solar energy use.

Final Design Report for Application of Solar Energy to Industrial Frying of Soybeans
Feb. '77, 376 pp. English
ORO-5122-1 **PC A17/MF A01**

Drying soybeans with solar energy was studied with two principal objectives: (1) the preliminary design of a solar heating system for retrofitting on an existing industrial process and (2) the evaluation and demonstration of the effectiveness of such a system. A data acquisition system that provides data in several different forms was designed to evaluate system performance. Manufacturers' data verified and extended by computer simulations and analysis indicate that the solar collectors of the solar drying system will operate at an essentially constant annual efficiency (some 52 percent). Additional analyses indicate that, with the solar drying system, the time-varying nature of the solar energy input will have no undesirable impact on the operation of a nominal bean drying process.

A VALUABLE SOURCE
OF INFORMATION

APPROPRIATE TECHNOLOGY:
A Bibliography of Books
and Other Materials

Nov. 1978; 113 pp. English

Listed in this bibliography are 409 titles on village or intermediate technology which have been tried and tested. An index contains 417 subjects on which information may be obtained. Addresses and sources for obtaining these documents are given at the end of the bibliography.

PB 296 582 PC A06/MF A01

NTIS REPORTS ON COMMUNITY DEVELOPMENT

A National Program to Develop and Implement Technologies Appropriate for Low-Income Communities
Sept. '76, 93 pp. English
PB 262 338 PC A05/MF A01

This proposal for a national center for appropriate technology suggests a program of research and development. It is directed toward developing, modifying, adapting, and implementing technologies which can be helpful to poor people. It deals with the problems of rapidly increasing energy cost and technological support to a weatherization program.

Rural Community Action: Status and Recommendations
Oct. '77, 137 pp. English
PB 275 811 PC A07/MF A01

The report describes the conditions and problems of the rural poor, with their limited resources and mobility. Also discussed is the lack of necessary job skills, poor housing stock, and inadequate health care. Successful rural community action programs are described and recommendations for future directions are given.

Community Development, Volume 2, Making Council Meetings More Successful
May '62, 14 pp. English
PB 287 247 PC A02/MF A01
French version, PB 287 248
Spanish version, PB 287 249

The brochure is a helpful guide for those responsible for planning and conducting effective meetings in all areas of community planning and development.

Community Development, Volume 3. CD in Urban and Semi-Urban Areas
May '62, 22 pp. English
PB 287 244 PC A02/MF A01
French version, PB 287 245
Spanish version, PB 287 246

The development of urban communities cannot be successful unless programs are planned and integrated with rural sectors of the country. In this booklet the principles and approaches of community development are applied, explored, and studied with the idea of modifying them for use in urban development work.

Community Development, Volume 5. Community Development, Extension and the Village-Aid Synthesis
May '62, 17 pp. English
PB 287 238 PC A02/MF A01
French version, PB 287 239 PC A03/MF A01
Spanish version, PB 287 240 PC A02/MF A01

The paper is concerned with making community development a reality. It discusses how to help people acquire attitudes, skills, and ideas that will enable them to assume more responsibility and initiative.

Community Development: Conference on Conference Planning, Series A, Volume 6
May '62, 33 pp. English
PB 287 235 PC A03/MF A01
French version, PB 287 237
Spanish version, PB 287 236

This manual includes detailed methods of conference planning and procedures. It is concerned with the methods of: using conference planning as a training-ground for conference, leadership, planning follow-up programs, and making your own tool kit from printed materials available to conference planners and participants.

Community Development, Volume 7. The Village-Aid Worker and Democratic Program Planning
June '62, 35 pp. English
PB 287 234 PC A03/MF A01
French version, PB 287 232
Spanish version, PB 287 233

In this pamphlet are ideas helpful in village and rural program planning. Included are practical approaches to program planning from a variety of programs throughout the world.

Planning Small Water Supplies in Developing Countries
1972; 141 pp. English
PB 219 774 PC A07/MF A01

A theoretical planning model for deciding water supply timing and scale in small communities of developing countries is provided. The model focuses on several communities and includes considerations of Manne's model pertinent to developing countries. All of the field data were obtained from Central America.

Village Technology Handbook (Manual de Technologia Para la Communidad)
1972, 342 pp. Spanish
PB 283 958/7 PC A15/MF A01
English version, PB 177 916 PC A13/MF A01

Village development takes on special importance in light of the fact that 80 percent of those who live in less developed countries live in villages. This handbook is aimed at helping villagers to master the resources available to them. The general topics covered include water transport, storage, and purification; latrines; bilharziasis control, irrigation and road-building; poultry raising; silage; storing food at home; storing vegetables and fruit for winter use; how to salt fish; concrete construction; bamboo construction; glues; solar water heater; washing machines; cookers and stoves; home soap making; and bedding.

Institution Building: A Source Book
1973, 331 pp. English
PB 282 835 PC A15/MF A01

This final report gives a descriptive bibliography of the literature on institution building. Case studies are classified according to type of institution. Topics covered include agriculture, business administration, community development, cooperatives, educational institutions, government operations, planning organizations, public administration, trade unions, cross-sectional analysis of institutions, and technical assistance in institution building, systems, strategies, and tactics.

Science, Technology, and Development, Volume VII. Social Problems of Development and Urbanization
1962, 99 pp. English
PB 207 500 PC A05/MF A01

Volume 7 of a 12-volume series on science and technology in developing countries includes the following papers: Patterns of worldwide cultural change in the 1960s; Social stratification and social mobility in the development process; A theory of community development; The role of the family in industrialization; Adjusting rural people to an urban environment; Implications of urbanization for villages and rural sectors; Planning and development in metropolitan areas; Housing and community facilities in human development; Capital requirements for urban social overhead; and the political implications of urbanization and the development process.

USES OF AGRICULTURAL BY-PRODUCTS

Utilization of Sewage Sludge on Land. A Bibliography of Selected References Covering the Period 1950-1977
1978, 171 pp. English
N79-12967/2 PC A08/MF A01

Three hundred ninety references beginning from 1950 cover all aspects of spreading sewage sludge on agricultural ground. Included are pretreatment of sludge, effects of sludge on the soil and on plant growth, presence of organisms and metals in sludge, economic aspects, nutritional value, and methods and equipment for applying sludge to the land.

The Agricultural Value of Dredged Material
Jul. '78, 171 pp. English
AD-A061 298/6 PC A08/MF A01

An alternative for disposal of dredged sediments is to use them beneficially to amend marginal agricultural soils. The soils and dredged material samples were dried, ground, and mixed for plant growth studies and laboratory analysis. It is concluded that the dredged material used in this study would be beneficial for increasing agricultural production when mixed with marginal soils. Physical, chemical, and plant growth data were used to develop guidelines for the disposal of dredged material on marginal soils.

Energy and Protein Production from Pulp Mill Wastes
Mar. '78, 9 pp. English
COO-2983-7 PC A02/MF A01

Research efforts in the past have centered on increasing yeast protein production using ozonated spent sulfite liquor (SSL) and improving the biodegradability of SSL by ultrasonic treatments. Continuous-flow fermentation experiments demonstrated the suitability of ozonated SSL as a substrate for Torula yeast growth. Yeast yields averaging between 2.0-2.2 g/l of SSL were obtained at the optimum retention time of 1.8 days. This contrasts to yeast production rates of 4.8-5.0 g/l of SSL in two day batch cultures. Lower yields were expected under continuous flow conditions as compared to batch conditions, but production rates were sufficient to warrant further investigation.

State of Knowledge in Land Treatment of Wastewater. Volume 1.
International Symposium August 20-25, 1978, Hanover, N.H.
Aug. '78, 426 pp. English
AD-A067 885/4 PC A19/MF A01

This international symposium summarized the state of knowledge of the practical aspects of the treatment of wastewater by land application. Suitable approaches for the design of such land treatment systems were identified.

State of Knowledge in Land Treatment of Wastewater. Volume 2.
Aug. '78, 405 pp. English
AD-A067 886/2 PC A18/MF A01

Topics included in this volume are: site selection considerations, case studies of national and international concern, health effects of land treatment systems, pretreatment considerations, uses of wastewater in agricultural and forest systems, monitoring, modeling and design critreia. Volume 1 contains 46 invited papers. Volume 2 contains 53 papers.

Gasohol from Grain—The Economic Issues
Jan. '78, 23 pp. English
PB 280 120/7 PC A02/MF A01

Use of fermentation alcohol from grains as a motor fuel supplement is discussed in this report. This project will require the production of 10 billion gallons of ethanol to mix with 90 billion gallons of gasoline to produce 100 billion gallons of gasohol anually. An economic assessment of the project is provided.

Technical and Economic Assessment of Methods for Direct Conversion of Agricultural Residue to Usable Energy
Oct. '76, 139 pp. English
PB 275 082/6 PC A01/MF A01

This report is a technical and economic assessment of methods for direct conversion of agricultural residues to usable energy on single farms, feedlots, processing plants, or small agricultural communities. The study considers energy conversion systems with capacities ranging from 2 to 200 tons of organic material per day. Production of energy for mobile and stationary use is covered. Systems examined in detail are anaerobic digestion, pyrolytic production of low Btu gas, hydrolysis and fermentation to ethanol, and Fischer-Tropsch pyrolysis to liquid fuels.

A complete Disposal-Recycle Scheme for Agricultural Solid Wastes
May '77, 62 pp. English
PB 271 714/8 PC A04/MF A01

This investigation applies the anaerobic method to the production of methane gas using sludge from cow manure and farm plant clippings. The quantity and quality of gas produced, the biochemical and chemical oxygen demands, and the nutritional value of the digested sludge for both the laboratory and full-scale plants were evaluated.

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Bioconversion of Agricultural Wastes for Pollution Control and Energy Conservation, Final Report

Sept. '76, 354 pp. English
TID 27164 **PC A16/MF A01**

This report is a study of the feasibility of generating natural gas on dairies (40 and 100 cows) and beef feedlots (1000 head) using the anaerobic fermentation process. The technical, economic, and practical feasibility are estimated. The estimated costs of generating methane on 40- and 100-cow dairies and on a 1000-head beef feedlot were $22.80, $13.40, and $4.50, respectively, per 10 exp 6 kcal. Detailed analyses of the three operations estimated that the actual costs for use would increase to $80, $39, and $11, respectively, per 10 exp 6 kcal for specific operations. Farms with more than 100 cows can consider the technology as an income-producing operation.

Clean Fuels from Agricultural and Forestry Wastes

Apr. '76, 118 pp. English
PB 259 956/1 **PC A06/MF A01**

The report gives results of an experimental investigation of the operation of a mobile waste conversion system based on a partial oxidation pyrolysis process. The testing determined the combination of parameters that produced the most char and oil and the least gas from agricultural and forestry wastes. A 200-ton/day mobile pyrolysis system was designed to convert agricultural and forestry wastes into clean fuels. A simplified economic analysis was conducted. The results of this work indicate the technical feasibility and the economic profitability of such a system.

Fuel and Energy Production by Bioconversion of Waste Materials—State-of-the-Art

Aug. '76, 78 pp. English
PB 258 499/3 **PC A05/MF A01**

This report is a state-of-the-art summary of biological methods for converting waste cellulosic materials (agricultural, municipal, and lumbering wastes) to fuels. It indicates the locations and quantities of suitable wastes and discusses the status of the current processing schemes. The methods discussed are: acid hydrolysis followed by fermentation; enzyme hydrolysis followed by fermentation; anerobic digestion of manure and municipal solid waste; and biophotolysis.

Systems Study of Fuels from Sugarcane, Sweet Sorghum, and Sugar Beets, Third Quarterly Report

Apr. '76, 149 pp. English
TID-27032 **PC A07/MF A01**

Methods are suggested to derive fuel economically from sugar cane, sugar beets, and sweet sorghum. The sugar cane and sugar beet productivity per acre and the production costs are estimated. Sugar cane is suitable for tropical and subtropical climates; the sugar beet can be grown in temperate climates. The two most promising methods for the thermochemical conversion of the plants into synthesis gas are the Bailie and Purox process.

Fuels from Sugar Crops: Systems Study for Sugarcane, Sweet Sorghum, and Sugar Beets

July '78, 148 pp. English
TID-22781 **PC EO2/MF A01**

An extensive analysis is made of the technical and economic feasibility of producing fuels and chemicals from the sugar crops (sugar cane, sweet sorghum, and sugar beets). It is concluded that ethanol and ammonia are the most promising products. Ethanol produced by fermentation of juice or molasses is close to economic competitiveness. The ammonia cost is not yet competitive but could be competitive with coal-produced ammonia. Sugar cane appears to be the most promising crop in the short and intermediate term; sweet sorghum has the greatest long-range appeal. The development of processes to manufacture ammonia, methanol, acetic acid, and thermochemical substitute natural gas (SNG) from sugar crop residues depends on technology to generate synthesis gas. The agricultural aspects of sugar crops research are summarized.

AGRICULTURAL DEVELOPMENT

Rural Enterprises: An Overview of the Role and Potential of Rural Enterprises to Contribute to the Employment and Income of the Rural Poor

Apr. '77, 19 pp. English
PB 285 984 **PC A02/MF A01**

By providing a supportive environment for rural-based enterprises, governments can potentially improve the welfare of rural populations and further stimulate agricultural production. The paper discusses how rural enterprises can contribute to the overall economy and what mechanisms have been used to stimulate their development.

Problem Assessment in Arid Land Ecology and Management

Oct. '78, 111 pp. English
PB 295 922 **PC A06/MF A01**

Land uses and the disciplines affected are presented in this report. Land uses covered include agriculture dryland, irrigation, livestock grazing, industrialization, mining, recreation, urbanization, and water development. Effects of these land uses on climate, endangered species, rangelands, soils, vegetation, watershed, wild animals, and humans are considered. Problem areas are delineated for each of the land use categories and the disciplines affected.

Bibliography on the Economics of Fruit and Vegetable Production and Marketing, 1965-76

May '79, 117 pp. English
PB 296 176/1 **PC A06/MF A01**

The bibliography lists research reports on the economics of the production and marketing of fruits and vegetables. It includes references on costs, prices, grades, competition, market structure, projections, shipments, processing, and miscellaneous activities. The last section is an author index with page number references.

Engineering for Appropriate Technology Farming Systems in the Lowland Humid Tropics

1976, 28 pp. English
PB 294 645/7 **PC A03/MF A01**

Illustrated and discussed in this report are the tools developed for increased crop production in the humid-tropics. They include: hand-held planters, propelled planters, a controlled-droplet-application agrochemical applicator, a hand maize sheller, a stripper harvester for rice and similar cereal crops, strip tillage, and mechanized cassava lifting. Tables are given for comparing methods and productivity.

Small Farm Grain Storage, Volume I. Preparing Grain for Storage

Sept. '76, 209 pp. English
PB 292 909/9 **PC A10/MF A01**

This report discusses grain storage problems as faced by small-scale farmers. It explains the structure of grain, the relationship between grain and moisture, and the need for proper drying. One large section contains detailed, fully-illustrated plans for constructing a variety of small-scale grain dryers.

Small Farm Grain Storage, Volume II. Enemies of Stored Grain

Sept. '76, 180 pp. English
PB 292 910/7 **PC A09/MF A01**

This is an indepth study of two major enemies: insects and rodents. Each is discussed in detail with guidelines for defining the size of the problem and protecting grain by chemical and non-chemical means. This volume includes dose and use information for a variety of pesticides, as well as suggestions for preparing materials for audiovisual presentations.

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AMTID

APPLICATION OF MODERN TECHNOLOGY
TO INTERNATIONAL DEVELOPMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C.

AMTID 80-3

As another addition to the NTIS Guest editorship series, ITCR in Costa Rica, a member of the USAID Technical Information Network, has edited this month's issue.

Dear Friend:
Every day the world energy situation confronts our countries with new problems, these being sometimes large and sometimes small. In order to solve these problems it is imperative that national policies be established in order to regulate the production and utilization of energy, as well as set up specific programs that develop appropriate technologies which utilize non-conventional energy resources.

In this issue of AMTID we are presenting abstracts which deal with:
—The planning and establishment of energy policies
—An analysis of the world energy situation
—The utilization of non-conventional energy resources,
and other topics which may help you to better understand the present energy situation and find the appropriate solutions to your particular energy problems.

Sincerely,

Ing. Gerardo Mirabelli B.
Guest Editor
Centro de Informacion Tecnologica
Instituto Tecnologico de Costa Rica

ENERGY

Industrial Refrigeration: Potential for Energy Conservation
Feb. '79; 22 pp. English
TREE-1337 **PC A02/MF A01**

This report uses theoretical and empirical information to identify the following major sources of inefficiency in industrial vapor compression refrigeration systems: temperature difference between the evaporator and condenser; waste heat lost via the condenser; nonideality of refrigerants; operation of system at lower than design peak load; inefficient heat transfer across heat exchanger walls; compressor inefficiency; irreversible expansion of refrigerant through the throttling value; and superheating and supercooling in the evaporator and condenser, respectively.

Technological-Economic Models for Energy Analysis
1978; 21 pp. English
BNL-24821 **PC A02/MF A01**

The energy system and economic models described in this paper are designed for general government and industry use. The energy analysis and technology assessment methodology consists of: a network diagram portraying the technical structure of the energy system; a linear-programming model to provide a technique for system design and synthesis; and a set of process models to represent the technological options in major energy-use sectors—residential- and commercial-space conditioning, steel, aluminum, paper, cement, and chemicals.

Ocean Thermal Energy Conversion (OTEC) Program. FY 1977 Program Summary
Jan. '78; 201 pp. English
DOE/ET-0021/1 **PC A10/MF A01**

An overview is given of the ongoing research, development, and demonstration efforts concerning Ocean Thermal Energy Conversion projects. These projects are grouped as: program support, definition planning, engineering development, engineering test and evaluation, and advanced research and technology.

Systems Study of Fuels From Grains And Grasses. Phase I. Final Report
Feb. '78; 270 pp. English
ALO-3729-1 **PC A12/MF A01**

The program consists of an analysis of viable contributions to energy needs from grasses and grains by the photosynthetic production of biomass. The study incorporates grain crop residues, whole plant biomass from grain crops and nongrain crops on cropland, and whole plant biomass from grasses on pasture, rangeland, and federal range. An assessment is given of current total biomass generation from the various grasses and grains on cropland, pasture, range, and federal range.

Identification of Probable Automotive Fuels Composition: 1985-2000
May '78; 225 pp. English
HCP/W3684-01/1 **PC A10/MF A01**

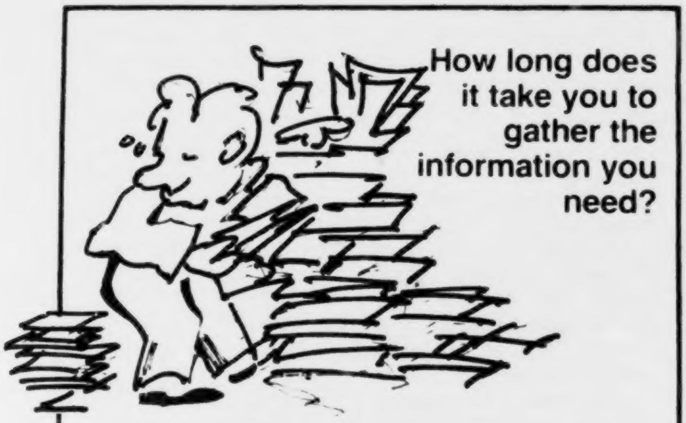
The factors and activities in the production of automotive fuels with synthetic hydrocarbon constituents and alcohol fuels derived from coal are traced and discussed in detail. These include selection of raw materials, syncrude compositions for a variety of conversion processes, and finished automotive fuels of composition based upon fuel demand projections for 1985 to 2000.

Energy Analysis and Oil Shale Reserves
Feb. '78; 25 pp. English
N78-31584/3 **PC A02/MF A01**

Resources and reserves of shale oil throughout the world are reviewed. The ultimate recoverable reserves of oil available from oil shales in the world and in the United States are assessed. The economically and efficiently recoverable reserves are given.

Energy Needs, Uses, and Resources in Developing Countries
Mar. '78; 158 pp. English
BNL-50784 **PC A08/MF A01**

The report identifies energy needs, uses, and resources in developing countries and examines the energy options available to them for their continued social and economic growth. Most developing countries have not adequately explored and developed their own indigenous resources. In virtually all energy conservation and utilization processes there are opportunities for improving efficiency and substituting renewable energy forms.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Environmental Development Plan (EDP). Fuels From Biomass. 1977
Mar. '78; 54 pp. English
DOE/EDP-0005 PC A04/MF A01

The present status, program goal, and potential applications of biomass technology are briefly described. The environmental and socioeconomic impacts of biomass production and conversion are identified. Six key environmental issues are cited and their nature and planned research associated with them are discussed.

Photovoltaic Decision Analysis
Oct. '77; 38 pp. English
MIT-EL-77-020 PC A03/MF A01

The development and implementation of a methodology that analyzes information relating to the choice between flat plate and concentrator technologies for photovoltaic development are described. A decision analysis appoach is used to compare and evaluate the two photovoltaic energy conversion systems. This methodology provides a convenient framework for structuring the decision process in an orderly fashion.

Alternative Energy Technologies in Brazil
Feb. '77; 31 pp. English
PB-297 860 PC A03/MF A01

The possibilities for developing alternative energy technologies in Brazil are many and varied. Some of them are peculiar to the country; others are applicable elsewhere. This report outlines many possibilities, such as solar energy, water power, and bioconversion of waste.

Fuels From Biomass Symposium
1977; 220 pp. English
COO-4225-1 PC A10/MF A01

Methanol From Natural Gas for Engine Fuel
June '77; 30 pp. English
N78-32284/9 PC A03/MF A01

The water tolerance of the methanol/i-octane/benzene system was studied, including the effect on the water tolerance of the presence of selected additives. It was concluded that methanol/gasoline/i-butanol blends can be derived.

Chemicals From Wood Waste
Final Report
Dec. '75; 196 pp. English
PB-262 489/8 PC A09/MF A01

A study of the economics of producing chemicals from wood waste was carried out. Results included: (1) outlining chemical processes based on known technology for producing methanol, ethanol, formaldehyde, furfural, and phenols from wood waste; (2) estimating investment and operating costs for these plants; and (3) comparing the economics with those for producing the same chemicals from more conventional raw materials.

Synthetic Fuels From Municipal, Industrial, and Agricultural Wastes (A Bibliography With Abstracts)
June '79; 172 pp. English
NTIS/PS-79-0545 PC $30/MF $30

The bibliography covers research efforts involving producing synthetic fuels—gases and liquids—from solid wastes. These wastes include manure, sewage, paper, and wood. In most citations, methane is the primary fuel produced; however the production oils, ammonia, carbon monoxide, and methyl alcohol, are also discussed.

Fuel and Energy Production by Bioconversion of Waste Materials—State-of-the-art
Aug. '76; 78 pp. English
PB-258 499/3 PC A05/MF A01

A state-of-the-art summary of biological processes for converting waste cellulosic materials (agricultural, municipal, and lumbering wastes) to fuels is presented in this report. It indicates the locations and quantities of suitable wastes and discusses the status of the current processing schemes. The processes discussed are: acid hydrolysis followed by fermentation; enzyme hydrolysis followed by fermentation; anaerobic digestion of manure and municipal solid waste; and biophotolysis.

Energy Recovery From Solid Waste: A Review of Current Technology Final Rept.
July '76; 68 pp. English
PB-260 633/3 PC A04/MF A01

This report will help a community in selecting an energy recovery solid waste disposal system. The choice of an appropriate conversion process for energy recovery is highly sensitive to each local situation. A critical factor to be considered in the selection of any conversion process is the economic aspect of each system. A discussion of the economic factors and the relative advantages and disadvantages of each process is included.

WIND ENERGY

Analysis of the Potential of Wind Energy Conversion Systems
1979; 24 pp. English
SAND-78-2099C PC A02/MF A01

This presentation reviews the flow of solar energy and wind, describes the time and space distribution of useful wind power, considers some of the modern machinery that has been conceived to capture wind energy, points out some limitations to practical wind energy extraction and use, and summarizes available and projected wind power hardware systems.

Availability of Wind Power
1978; 15 pp. English
SAND-78-0548C PC A02/MF A01

Meteorological studies of wind power were begun in Brazil in 1973 to support the development of a vertical-axis wind turbine. This presentation reviews work to date and summarizes climatological studies that are needed to assist and promote wind energy exploitation in Brazil.

Siting Handbook for Small Wind Energy Conversion Systems
May '78; 118 pp. English
PNL-2521 PC A06/MF A01

This handbook provides siting guidelines for laypersons considering the use of small wind energy conversion systems. The authors intend for this edition to serve as a review copy prior to wider distribution.

Wind and Solar Energy Applications Study
Aug. '77; 113 pp. English
PB-287 593–8 PC A06/MF A01

Engineering consultants, government authorities, technology assessment specialists, and businesspersons were contacted for ideas on writing this report. The result is a broad implementation plan highlighting seven typical applications—three solar, three wind, and one combination.

SOLAR ENERGY

Implementation of State Solar Incentives: Financial Programs
Feb. '79; 64 pp. English
SERI/TR-51-160 PC A04/MF A01

This report emphasizes major incentives for installing solar energy systems, either through reducing the market cost to buyers or removing legal or institutional barriers. The objective of this study is not to judge the design of state incentive programs or to criticize the activities of rule-setting and administering agencies. Rather, the emphasis is on gathering, assessing, and disseminating information resulting from the practical experience of officials in various areas.

Application of Solar Technology to Today's Energy Needs. Volume II
Sept. '78; 763 pp. English
PB-289 762/7 PC A99/MF A01

Volume I (PB-283 770) of this report reviews a range of solar energy systems designed to produce thermal and electrical energy directly from sunlight, with units small enough to be located on or near the buildings they serve. It examines the state-of-the-art technology, identifies the circumstances under which such systems could be economically attractive, and discusses the problems encountered in integrating these devices into existing energy generation and delivery systems. Volume II specifically deals with backup requirements, systems analysis, and costs.

SELECTED APPROPRIATE TECHNOLOGY INFORMATION FOR DEVELOPING COUNTRIES

Abstracts from the NTIS Data File

This bibliography is an edited search of "appropriate technology" citations from the NTIS Bibliographic Data File. Over 2,000 citations with abstracts are included. The information is broad in scope covering many fields but pertains to one or more of the following categories: smaller-scale technologies, labor-intensive technologies, low-cost technologies, revived technologies, improved traditional technologies, alternative techniques, useful social and mangement technologies, and selected modern technologies adaptable to the local needs and environment.

March '80; 398 pp. English:
PB80-117 666 PB $5.50/
MF $3.50

This second edition supersedes issue number one (PB294 160) published in February 1979 entitled *Selected Appropriate Technology for Developing Countries*.

Prototype Solar Heating and Cooling Systems Including Portable Hot Water
Oct. '78; 35 pp. English
N79-13498/7 PC A03/MF A01

These quarterly reports summarize the activities from November 1977 through September 1978, covering the progress made in the development, delivery, and support of two prototype solar heating and cooling systems including portable hot water. The system consists of these subsystems: solar collector, auxiliary heating, potable hot water, storage, control, transport, and government-furnished site data acquisition.

Installation Package for Concentrating Solar Collector Panels
Aug. '78; 55 pp. English
N78-32548/7 PC A04/MF A01

The concentrating solar collector panels comprise a complete package array using modified Fresnel prismatic lenses for a 10-

to-1 concentrating ratio, supporting framework, fluid manifolding and tracking drive system, and unassembled components for field construction.

Installation Package for a Domestic Solar Heating and Hot Water System
Aug. '78; 51 pp. English
N78-32547/9 PC A04/MF A01

The installation of two prototype solar heating and hot water systems is described. The systems consist of these subsystems: solar collector, storage control, transport, and auxiliary energy.

Design and Fabrication of Solar Cell Modules. Final Technical Report
Apr.'78; 43 pp. English
DOE/JPL/954655-1 PC A03/MF A01

A six-month program was conducted between December 1976 and May 1977 to design, fabricate, and evaluate 12 silicon solar cell modules. A module design incorporating elements of new technologies was developed. Module development emphasized a technically and economically competitive design based upon the use of ion implanted solar cells and a glass encapsulation system. Special considerations which may be associated with these approaches are examined in this report.

Technology for Conversion of Solar Energy to Fuel. Mariculture Investigation: Ocean Farming and Fuel Production
Jan. '74; 152 pp. English
PB-286 514/5 PC A08/MF A01

Large scale ocean farming is investigated for the production of an energy crop which could be converted to fuel. The investigation includes a search of the literature and evaluates the data on ocean site characteristics, plant properties, hydrodynamics, fuel production, nutrient diffusion, ocean equipment, and mechanical processing. The data are assimilated into three growing models—the Offshore Current Floating System, the Deep Ocean Floating System, and the Offshore Current Anchored System. An economic evaluation is made for each model.

Technology for the Conversion of Solar Energy to Fuel Gas Annual Rept.
Jan. '74; 153 pp. English
PB-238 103/6 PC A08/MF A01

The formation of methane by biological conversion of organic materials is examined. The materials exposed to the anaerobic fermentation process include paper, grass, household garbage, fresh water algae, water hyacinth, seaweed, cattle manure, dry manure, and dry dog food. During operation of the digester, the amount and composition (methane and carbon dioxide) of the gases produced by the fermentation are determined and chemical analyses of the composition of the liquid contents of the digesters are calculated.

Solar Energy in Developing Countries: Perspectives and Prospects
Mar. '72; 60 pp. English
PB-208 550 PC A04/MF A01

This report assesses the state-of-the-art in utilizing solar energy for developing countries and reviews current practical applications, identifies promising areas for research and development and, examines the desirability of etablishing an international solar energy institute in North Africa to carry out solar energy research and development.

WATER TREATMENT

Water Treatment for Small Public Supplies
May '78; 74 pp. English
PB-285 963/5 PC A04/MF A01

The project describes the selection, design, construction, and operating procedures for a portable water treatment system using reverse osmosis and electrodialysis to improve drinking water supplies. The project develops specific cost data to extend available water treatment technology and provides the necessary material for assimilation of this unit or comparable equipment into the educational activities of water supply and water treating.

The Reclamation of Drinking Water from Sewage
Feb. '75; 74 pp. English
AD-A008 453/3 PC A03/MF A01

Indirect reuse of wastewaters in drinking water supplies is common practice in industrialized states today. This report discusses improvement of existing techniques more applicable to the tropical and savanna developing country. Investigations were conducted in nitrogen stripping by photosynthetic algal growth, using the nitrogen as a nutrient with subsequent algae harvest from ponds, and low level organics reduction.

Effects of Water-Treatment-Plant-Wastes on Domestic Wastewater Treatment Processes
July '77; 116 pp. English
PB-280 970/5 PC A06/MF A01

The principal and most troublesome waste produced during ordinary domestic water treatment is alum sludge. Among the more promising techniques to remove this sludge is discharging it to a domestic sewerage system. The effects of alum-water-treatment-plant sludge on primary clarification, anaerobic sludge digestion, activated sludge wastewater treatment, and the dewatering of various sludges were investigated.

The Application of Wind Energy Systems to Desalination
Apr. '77; 68 pp. English
PB-276 174/0 PC A04/MF A01

The impact of rapidly increasing fuel costs has all but made saline water conversion uneconomical. However, applying wind energy systems to membrane processes for brackish water conversion offers an economical solution. It is possible to desalt brackish water at less than $1 per thousand gallons with large wind energy/desalination systems. Research and development efforts in this area are included.

Removal of Chloroform From Drinking Water
June '79 English
PB-285 819/9 PC A05/MF A01

The technical feasibility of reducing trihalomethane levels in drinking water is evaluated. Trihalomethanes are present in municipal drinking water due to the reaction of free cholorine with naturally occurring compounds collectively called 'recursors'. A variety of treatment processes and potential modifications (or additions) to existing treatment facilities were evaluated for a precursor and trihalomethane removal.

Rural Potable Water Chlorination
1970; 41 pp. English
PB-282 460/5 PC A03/MF A01

Several chemicals and hypochlorinators are described and evaluated. A low-cost, dependable feeding device for disinfecting marginal waters in the rural areas of developing countries is presented. The operation and maintenance of this device is easy for the unskilled labor in these areas; no sophisticated power source is needed to provide continuous, automatic operation; the device uses a readily available, commercial chlorine chemical that can be economically shipped, stored, and used at points of need. An appendix includes technical specifications and performance data.

Criteria for the Production of High Purity Water
Nov. '77; 65 pp. English
AD-A049 032/6 PC A04/MF A01

Information is presented on high purity water systems. It includes a discussion of water quality; a summary of commonly used water quality criteria; description of and design considerations for ion exchange, reverse osmosis, distillation, filtration, and carbon adsorption operations; and distribution and storage of high purity water to include construction materials.

Natural Sewage Recycling Systems
Jan. '77; 40 pp. English
BNL-50630 PC A03/MF A01

The development of natural systems which produce potable water from sewage is reviewed. Conventional treatment plant hardware beyond aeration is not used in these prototype marsh/pond and meadow/marsh/pond systems and no sludge is generated. Experiments with two prototype systems are described and performance data are presented in detail for the marsh/pond. Empirical interpretations of results achieved to date are suggested for use in the design of marsh/ponds as natural sewage recycling systems. Construction and operating costs for a proposed 250,000 gpd. plant are presented.

Modern Thinking in Waste Water Management
1977; 13 pp. English
N78-25967/8 PC A02/MF A01

Wastewater management in South Africa is reviewed. Discussed are: changing quality of water; water quality criteria; national water quality network; health aspects; epidemiology studies-health hazards; and domestic use of reclaimed water—public acceptance criteria for plant design.

Estimating Costs for Water Treatment as a Function of Size and Treatment Efficiency
Aug. '78; 29 pp. English
PB-285 274/7 PC A13/MF A01

This interim report discusses unit processes capable of removing contaminants in water. Construction and operation and maintenance cost curves are presented for 30 unit processes, which are considered to be especially applicable to contaminant removal. Operation and maintenance requirements may be readily updated or adjusted to local conditions, since labor requirements are expressed in hours per year, and electrical requirements in kilowatt-hours per year.

CONSTRUCTION

A Study of the Feasibility of Utilizing Solid Wastes for Building Materials. Phase I Summary Report
Apr. '78; 164 pp. English
PB-279 440/2 PC A08/MF A01

A study to research and develop building materials containing organic and inorganic wastes and waste-derived products is presented in this report. A comprehensive literature search reviewed and evaluated wastes with potential as matrices, reinforcements, or fillers in building composites.

Use of Polymers in Highway Concrete
July '78; 87 pp. English
PB-286 027/8 PC A05/MF A01

This report describes a series of laboratory and field studies to demonstrate the feasibility of polymer impregnation of concrete bridge decks. It includes the upper surface to depths that will encase the top layer of reinforcement to arrest or prevent spall—and pothole-causing corrosive action. Deep impregnation of typical salt-contaminated concrete was achieved in the laboratory when the concrete was brought to a dry condition. Impregnation was found to arrest the corrosion of reinforcing steel, virtually eliminating freeze-thaw damage, and to increase the resistance of the concrete to chemical attack. The research employed a methyl methacrylate mixture.

NOW AVAILABLE IN SPANISH

SMALL WELLS MANUAL

A MANUAL OF LOCATION, DESIGN

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AND MAINTENANCE

A basic introductory textbook, this manual provides instruction and guidance to field personnel seeking a stable water supply. It describes the construction, operation, and maintenance of small-diameter, relatively shallow wells for individual and small community water supplies. The information can be used by technical or non-technical people and should prove useful in training water well drillers by providing background material for their field experience. This publication can be ordered in Spanish by requesting:

PB 80-115 884; PCA08/MFA01:

English version: PB190 672;
PCA08/MFA01
September 1969; 163 pp.

Energy Use for Building Construction: Supplement. Final Report
Oct. '77; 120 pp. English
COO-2791-4 PC A06/MF A01

More information on energy per unit of component in major areas of building construction is presented in this report. Major areas include metal doors and windows, plastics, plumbing fixtures, plumbing fittings, heating equipment, electrical equipment, copper pipe and wire, aluminum pipe and wire, and asphalt. An examination of energy distribution in typical 1-family residential construction is given.

Ferrocement: Applications in Developing Countries
Feb. '73; 105 pp. English
PB-220 825/4 PC A06/MF A01

A panel was convened to concentrate on three tasks: evaluate the current state-of-the-art of ferrocement as an engineering material; evaluate the principal areas of application on both land and water; and develop specific recommendations for promoting the logical, effective use of ferrocement.

Research Methods for Housing and Urbanization Studies in Developing Countries
June '69; 479 pp. English
PB-210 128 PC A21/MF A01

A pilot study or urban housing was undertaken in San Juan, Puerto Rico, to design and test methodological tools for housing research in the urban areas of Latin America. Social, economic,

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demographic, and political aspects of urban housing were studied. This document is based on the findings of that study. Socio-economic and demographic characteristics of families, attitudes, aspirations, and value orientations with respect to housing are explored.

Handbook for Building Homes of Earth
1968; 160 pp.
PB-286 423 French
PC A08/MF A01
PB-179 327 English
PC A08/MF A01
PB-292 747 Spanish
PC A08/MF A01

Contents: introduction—types of earth houses; soils and what can be done with them; soil stabilizers; site preparation; foundations; lightweight roofs; getting the soil prepared; making adobe blocks; making pressed earth blocks; making walls of pressed blocks; making walls of rammed earth; roofs for earth houses; floors for earth houses; surface coatings.

Prolonging Life of Wood in Houses
June '67; 43 pp.
PB-210 129 English
PC A03/MF A01

Wood dwellings frequently deteriorate rapidly due to design errors or improper curing, use, or protection of the wood. This document contains the most widely accepted information on protection of wood. It is intended to serve as a reference and checklist for housing technicians. The topics include: Sources and protection of damage; wood preservatives; methods of treatment; soil poisons; air drying lumber; boilerless dry kilns; and drying by solar radiation.

AGRICULTURE AND AQUACULTURE

The Performance and Economic Feasibility of Solar Grain Drying Systems
Feb. '78; 39 pp.
PB-280 196/7 English
PC A03/MF A01

The performance and costs of eight experimental on-farm solar collectors designed to dry corn were studied. Solar drying costs were compared with the costs of owning and operating conventional grain dryers. The solar grain drying systems studied include: Rock heat-storage, flat-plate, inflated tube, suspended plate, wraparound, intensifier, air-supported, and multiuse.

Solar Energy Applications in Agriculture: Potential, Research Needs, and Adoption Strategies
Jan. '76; 319 pp.
PB-265 105/7 English
PC A14/MF A01

This study assesses present agricultural operations to determine those with potential for use with solar energy, develop recommendations for an experimental research program to establish the technical and economic feasibility of using solar energy in agricultural operations, and formulates recommendations for strategies to adopt solar energy components and systems in agriculture.

Aquacultural Developments in Peru
Apr. '72; 57 pp.
PB-211 671 English
PC A03/MF A01

To reduce the outlay of foreign exchange for the importation of beef, the Government of Peru is striving to develop the country's fisheries resources. This report reviews the status of aquaculture in Peru and provides a series of recommendations for future development. Some of the topics covered include the potential for coldwater and warmwater fishculture; a proposed project for culturing fish in pens; a proposed warmwater aquacultural research station; organizational structure of the Ministry of Fisheries; existing fisheries stations and equipment; and fisheries personnel and their training.

The Technological Basis for Development of Aquaculture to Produce Low-Cost Food Fish
1973; 56 pp.
COM-73-50645-11 English
PC A04/MF A01

The technological basis for development of large-scale production of inland water fish such as carp, buffalo fish, tilapia, and white amur is reviewed. The fish would be processed for maximum recovery of edible flesh by mechanical methods of flesh separation. The minced flesh would be modified and stabilized to prepare high-quality frozen fish blocks. These blocks would be suitable for a wide variety of frozen fishery products and convenience foods and could be used as protein additives in other foods such as processed meats.

Some Remarks on Aquaculture
1971; 262 pp.
COM-73-10115 English
PC A12/MF A01

An appraisal of the development of aquaculture should be approached through systems models; crude modeling leads to the definition of specific research needs. As such research is undertaken, its results are fed back into more refined models to answer the overall question: What is the true potential of aquaculture and how can it be attained?

Fishculture Survey Report For Costa Rica
May '70; 42 pp.
PB-211 643 English
PC A03/MF A01

The report presents observations and recommendations about inland fisheries of Costa Rica. The survey was undertaken to provide technical advice on freshwater fisheries research programs in the country and on developing programs for the production of fish for food by farmers or commercial investors. The topics covered in the report include: general conditions in Costa Rica which affect fishculture considerations; government divisions responsible for fisheries development; fishculture research and training; and available sources of capital, land, and feedstuffs.

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AMTID

APPLICATION OF MODERN TECHNOLOGY
TO INTERNATIONAL DEVELOPMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C.

AMTID-80-4

This month's guest editorship comes from the Thailand Management Association, a member of the USAID Technical Information Network.

Dear Friend,

It is indeed a great honor and a real pleasure to be a Guest Editor for AMTID. Our selection for the topic of this issue is agriculture and food technology. The world population is expanding at an ever increasing rate. In addition, many countries have had their agricultural and food systems disrupted by war and natural disasters. Hence, the production of food is of central importance to the well being of mankind.

Today AMTID is playing a very important role in collating and disseminating vital information to developing countries about the methods and techniques for increasing the output of food. Users of this service may learn a great deal from the contents of this issue. A wise man once said, "he who learns from his own experience is smart, but he who learns from the experience of others is even smarter."

We hope that readers of AMTID will find this issue, with its emphasis on agriculture and food technology, of particular interest. I am sure that those readers who live in agricultural countries, such as mine, will certainly find it most useful.

Suthep Visavakul
Guest Editor
TMA, Thailand

AGRICULTURE

The Benefits of Improved Technologies in Agricultural Aviation

Feb. '78, 362 pp. — English
N78-27045/1 — **PC A16/MF A01**

The economic benefits of technological improvements in agricultural aviation are discussed. Topics include: the ag-air industry and the data base used to estimate potential benefits. A summary of foreign ag-air activities and major ag-air aircraft use and manufacturers' sales and distribution networks is given. A bibliography of references is provided.

An Assessment of Controlled Environmental Agriculture Technology

Feb. '78, 476 pp. — English
PB-279 211/7 — **PC A20/MF A01**

The economic, environmental and social impacts of large-scale use of technology for growing food inside enclosures, Controlled Environment Agriculture (CEA), were assessed. These consist of: environmental degradation; shortages of arable land, water, and fertilizers; and unreliable production. The study includes a conceptual analysis of future systems, cost evaluations, and an analysis of non-economic considerations.

Systems Theory Applications to Agricultural Modeling: A Proceeding

Feb. '78, 75 pp. — English
PB-278 978/2 — **PC A04/MF A01**

The use of projections in public and private decisions is reviewed, with emphasis on agricultural decisions. At the public level the decisions deal with agricultural policy, program, and project problems, and at the private level with problems encountered by farm and agribusiness managers. There is a discussion of the impact of increased competence in economics and econometrics on the use of specialized projections with respect to agriculture.

Solar Technology Applications: A Survey of the Energy Requirements for Irrigation Pumping

Apr. '78, 18 pp. — English
UCID-17781 — **PC A02/MF A01**

An energy data base for irrigation pumping would be useful to determine the quantity of energy to be supplemented by solar systems. As a first step in developing such a data base, a single reference source is presented summarizing published information on the energy requirements for irrigation pumping. It is a compilation of references and a survey of ongoing work in this field. Much of the material is tentative, rapidly changing, and highly variable in time and place. The information should therefore be considered a guide and will be updated as additional information and references appear in the literature.

Agricultural Chemicals and Pesticides; A Subfile of the Registry of Toxic Effects of Chemical Substances

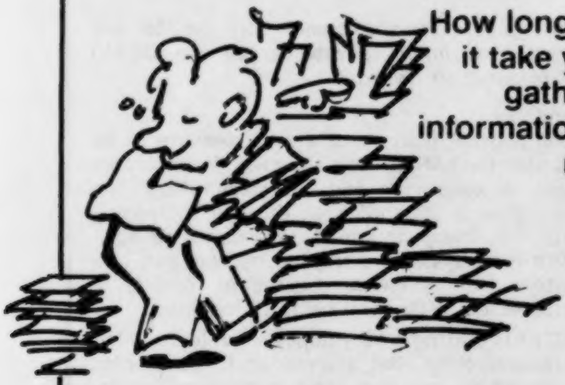
July '77, 273 pp. — English
PB-274 748/3 — **PC A12/MF A01**

This is the first edition of the subfile of agricultural chemicals and pesticides extracted from the NIOSH Registry of Toxic Effects of Chemical Substances. It contains 2,190 substances used for agricultural purposes. The subfile was prepared to provide toxicity data to help provide a safe, healthful environment for employees encountering agricultural chemicals at all stages of testing, synthesis, formulation, and use. Substances included are growth regulators, fertilizers, veterinary antibiotics, algicides, fungicides, herbicides, bactericides, disinfectants, insecticides, insecticide adjuvants, insect attractants and repellants, chemosterilants, acaricides, nematocides, molluscicides, avicides, and rodenticides.

An Energy Based Analysis of Alternative Production Methods and Cropping Systems in the Corn Belt

June '77, 47 pp. — English
PB-273 896/1 — **PC A03/MF A01**

This report identifies and evaluates cropping systems and production methods for major crops (corn, soybeans, wheat, and alfalfa) which would reduce the total energy inputs relative to the amount of product. The quantity and quality of inputs with respect to the quantity and quality of outputs were examined.



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The Role of Aerospace Technology in Agriculture. The 1977 Summer Faculty Fellowship Program in Engineering Systems Design
Sept. '77, 279 pp. English
N77-33580/0 PC A13/MF A01

Improving agricultural productivity through the application of aerospace technology was examined. An overview of agriculture and of the problems of feeding a growing world population are presented. The present state of agriculture, of plant and animal culture, and agribusiness are reviewed. Also analyzed are the various systems for remote sensing and their applications to agriculture. Also considered in detail are the social, legal, economic, and political results of technical applications to agriculture.

Appropriate Technology and Agriculture in the United States
1977, 29 pp. English
PB-276 055/1 PC A03/MF A01

This report surveys those in the United States currently active in the field of appropriate technology; describes their efforts, explores factors inhibiting the development and application of their innovations; reports on their recommendations for Federal and National Science Foundation activities in support of appropriate technology; and assesses the policy implications of appropriate technology.

Solar Technology Applications: A Survey of Solar Powered Irrigation Systems
Apr. '78, 46 pp. English
UCID-17510-Rev. 1 PC A03/MF A01

Published information on solar powered irrigation systems is presented. Thermal solar systems, thermoelectric solar systems, and photovoltaic solar systems are included. A bibliography and survey of ongoing work is presented.

Evaluation of Pesticide Supplies and Demand for 1978
Mar. '78, 29 pp. English
PC-281 603/1 PC A03/MF A01

World pesticide use is expected to increase nearly 50 percent between 1974 and 1984, with proportional increases for developing nations far exceeding those for developed nations. Supply estimates for this report are based on surveys of pesticide manufacturers and distributors. Demand estimates are based on farmers' planting intentions for 1978 and on data on pesticide use.

Agricultural Aviation Research
1977, 151 pp. English
N78-12999/6 PC A08/MF A01

This compilation of papers, comments, and results is from a workshop on the current state of agricultural aviation. Short- and long-range research and development areas are identified and ranked.

Solar Technology Applications: A Literature Review of Solar Thermal Powered Irrigation Systems
June '77, 20 pp. English
UCID-17510 PC A02/MF A01

The background, operation, and need for solar-thermal-powered pumps for irrigation is reviewed. A compilation of 38 references with summaries is presented.

Solar Grain Drying Conference Proceedings
Oct. '77, 286 pp. English
CONF-770140 PC A13/MF A01

Thirty papers are included, each with a separate abstract.

Models of Soil Loss, Land and Water Use, Spatial Agricultural Structure, and the Environment
July '74, 255 pp. English
PB-285 476/8 PC A12/MF A01

This study develops and tests a model capable of simulating the changes in national and regional variables relating to agricultural production while sheet and rill erosion is controlled. The model incorporates major agricultural commodities and determines their pattern of production in 223 areas of the continental United States. Within each area, nine land classes were defined based on the erosion characteristics of the soils. The results indicate that agriculture can meet present and expanded levels of demand while maintaining a gross field loss of soil set at a level below 5 tons per acre.

Controlled Environment Agriculture: A Global Review of Greenhouse Food Production
Oct. 73, 164 pp. English
PB-279 517/7 PC A08/MF A01

Controlled environment crop production on a commercial scale usually involves greenhouses. They have been used for food production for over a century, mainly in developed regions. The introduction of plastic film during the 1950's lowered construction costs and made it possible for less affluent nations to use greenhouses. Among the newer techniques of environmental control used commercially are artificial cooling, carbon dioxide enrichment, use of artificial soil, and automated irrigation with liquid fertilizers.

FOOD INDUSTRY

Compression of Rehydratable Vegetables and Cereals
Jan. '78, 66 pp. English
N78-25766 PC A05/MF A01

Characteristics of freeze-dried compressed carrots, such as rehydration, volatile retention, and texture, were studied by relating histological changes to textural quality education. The effects of storage temperature on freeze-dried compressed carrot bars were also discussed. Results show that samples compressed with a high moisture content undergo only slight structural damage and rehydrate quickly. Products prepared from carrot cubes having 48 percent moisture compared favorably with a freshly cooked product in cohesiveness and elasticity, but were found slightly harder and more chewy.

Structure of the Feed Manufacturing Industry, 1975. A Statistical Summary
Feb. '78, 163 pp. English
PB-278 990/7 PC A08/MF A01

Data on the U.S. feed manufacturing industry in 1975 are summarized by number of feed manufacturing establishments, physical output, methods of disposition, milling capacity, and efficiency of the industry. Detailed analysis has been done on a regional basis, as well as ownership and size category. Criteria for the major source of income were used to compare and relate activities of the different income groups to the overall industry.

Liquid Chromatographic Analysis of the Free Sugars in Sweet Corn: A Method Indicative of Maturity and of Quality Changes Related to Processing Techniques
July '77, 17 pp. English
AD-A052 688/9 PC A02/MF A01

The use of high performance liquid chromatography for the rapid analysis of individual free sugars in foods is demonstrated. The sucrose content of sweet corn (Var. Jubilee) was shown to depend on the maturity of the corn when harvested. A maximum value was obtained in corn picked 25 days after "half-silk". Moisture content and alcohol-insoluble solids are also reported for all samples.

Toxicants of Natural Origin in the Food Supply
Dec. '76, 17 pp. English
PB-273 235/2 PC A02/MF A01

Toxic chemicals may be intrinsic components of food or may be derived from other natural sources and enter the food supply by various routes. These chemicals include the fungal toxins (mycotoxins), naturally occurring toxicants, and toxins of marine origin. General research needs relating to these toxins include the determination of their specific health effects and the development of rapid, reliable, quantitative methods for their analyses.

MARINE RESOURCES

Marine Fisheries Review, Volume 40, Number 3, March 1978
Mar. '78, 80 pp. English
PB-283 823/3 PC A05/MF A01

This issue contains selected papers presented at a conference sponsored by Norden Laboratories. The papers are: Immunity and practical vaccine development; Cellular immunity in fish as measured by lymphocyte stimulation; Immunization of fish with bacterins of Aeromonas salmonicida; Immunization of channel catfish against two bacterial diseases; Immunization of salmonids for control of vibriosis; Vibriosis and current salmon vaccination procedures; Epizootiology of channel catfish virus disease; Serological screening of channel catfish virus; A Herpesvirus disease of Green Sea Turtles in acquaculture; Incidence of disease in warmwater fish farms; Enteric Red Mouth Disease; Vibriosis and Furunculosis in marine cultured salmon; Parasitic diseases of freshwater fishes; Ornamental fish: diseases and problems; Shellfish diseases; Control of fish diseases; and fish disease inspection and certification.

APPROPRIATE TECHNOLOGY DIRECTORY

MACHINES, TOOLS, PLANTS, EQUIPMENT, PROCESSES, AND INDUSTRIES

The Appropriate Technology Development Association; Lucknow, India

March '77, 264 pp. English

This directory describes simple technologies and industrial methods for small communities and rural areas. It is divided into 10 sections: Agro-tools, Hand Tools and Equipment for Crafts, Agro-processing, Village and Cottage Industries, Material Handling and Transport, Health and Hygiene, Education, Training and Culture, Work Power and Energy, Household and Domestics, and Housing and Construction. The introduction in each section explains the concept and philosophy of appropriate technology and provides guidance for its practice. A WHO'S WHO in appropriate technology lists individuals and groups involved in India and abroad.

To order this publication request:
PB 80-133 622 PC A12/MF A01

A Guide for the Recognition of Some Disease Conditions and Abnormalities in Marine Fish
Mar. '78, 65 pp. English
PB-284 021/3 PC A04/MF A01

Trawl catches and other types of fish landings can be examined for the existence and abundance of grossly-visible disease conditions by using this guide. The disease conditions and other abnormalities are: ulcers, fin erosion, tumors, lymphocystis, black spots, parasitic copepods, skeletal differences, reversal in flatfish, and abnormal pigmentation. Representative photographs and drawings are included.

Commercial Fishery Survey
Sept. '77, 92 pp. English
PB-275 422/4 PC A05/MF A01

This survey examines the status and value of the wild commercial fishery and fish farming industry of Arkansas from 1974 through 1976. Surveys of the commercial harvest of lakes and rivers, commercial fishermen and fish farmer interviews, and reports from retail fish markets were compiled. The value of the lake and stream commercial harvest, fish farming industry production, and processed fish products were calculated.

A Feeding Tray for Use in Eel Farming
Apr. '78, 16 pp. English
PB-284 734/1 PC A02/MF A01

An eel culture project demonstrated techniques used in farming of the American eel (Anguilla rostrata). Project personnel developed a baffled feeding tray which can be used for the mash feed mixture while preventing loss of food particles and resulting problems. The design assets of the baffled feeders include: access to the food in the mesh tray; baffles direct dislodged particles into a fine-mesh tray where they may then be eaten; and the fine-meshed tray is easily removed for cleaning of accumulated bone fragments or uneaten food.

ENERGY

Fuels From Biomass Program. Program Summary
Jan. '78, 104 pp. English
DOE/ET-0022/1 PC A06/MF A01

Ongoing research, development, and demonstration efforts are presented. Accomplishments are highlighted and plans for continued activities are included. Discussion is presented under the section headings: the Fuels from Biomass Program; organizational and functional responsibilities; program funding; current projects: production, collection, and conversion of biomass; bibliography; index of contractors; and appendix.

Drying Energy From Corn Cobs: A Total System, 1976 (Energy in Agriculture)
June '77, 11 pp. English
PB-274 718/6 PC A02/MF A01

This report presents a discussion on the successful and economical use of corn cobs as drying fuel. It is proposed that corn cobs could provide the necessary fuel for drying corn if: there were sufficient energy in the corn cobs; the cobs could be collected without interfering with harvest operations; the cobs could be handled without additional labor or management requirements; a satisfactory energy extraction method can be found which can put heated air into existing corn dryers; and it is economically justifiable. Each of the above conditions is evaluated with appropriate data.

Application of Solar Energy to Industrial Drying or Dehydration Processes. Final Report
Mar. '77, 149 pp. English
ORO-5121-1 PC A07/MF A01

The engineering design of a solar array applied to the preheating of both combustion and excess air for a rotary alfalfa dehydrator is reported. The alfalfa dehydration process and the design parameters or rotary dehydrator are described, including the energy consumed by the plant, the airflow of the dehydrator, and the interface between the dehydrator and the solar array. The design of the collector array is discussed, including the solar collector selection, the calculation of collector areas, and the simulations of the system performance.

Summary of Current Cost Estimates of Large Wind Energy Systems
Feb. '77, 64 pp. English
DSE/2521-1 PC A04/MF A01

This report reviews current studies, summarizes their results, and provides a view of the current status and uncertainties of the economics of generating energy from the wind for electric utility applications.

Design, Construction, and Testing of a Residential Solar Heating and Cooling System
June '76, 113 pp. English
COO-2577-10 PC A06/MF A01

The NSF/CSU Solar House I solar heating and cooling system began operating on July 1, 1974. During its first months, attention was focused on adjustment, "tuning," and fault correction in the solar collection and the solar/fuel/cooling subsystems. Following this initial period, analysis and testing of the system using a full year of data were accomplished. This report discusses the results of this analysis of the operation.

An Inexpensive Economical Solar Heating System for Homes
July '76, 59 pp. English
N76-27671/6 PC A04/MF A02

A low-cost solar home heating system to supplement existing warm-air heating systems is described. The report is in three parts: a brief background on solar heating, experience with a demonstration system, and information for the homeowner who wishes to construct such a system. Instructions are given for a solar heating installation where the homeowner supplies all labor necessary to install the components estimated to cost U.S. $2,000. Manufacturers and prices of each component used and a cost analysis based on these prices are included. This report also gives performance data from a demonstration system built and tested at the Langley Research Center.

Natural Gas Facts and Figures for 1974
May '76, 12 pp. English
PB-253 038/4 PC A02/MF A01

This report shows the sources and disposition of natural gas volumes in the United States during 1974. A general picture of how gas flows from the supply source to the end-use customer is given. Information is provided on average wellhead interstate and intrastate gas prices, city-gate prices (wholesale), and end-user prices (retail).

Chemical Characterization, Handling, and Refining of SRC to Liquid Fuels. A Bibliography of English References from 1957 to 1975. Task 1 Report
Jan. '76, 69 pp. English
ERDA-76-68 PC A04/MF A01

This bibliography contains English language references from

1957 to 1975. It covers the liquefaction of coal, hydrotreating, hydrocracking, and analysis and properties of solvent-refined coal (SRC) and similar materials.

Markets and Technology for Recovering Energy from Solid Waste
1974; 37 pp. English
PB-253 326/3 PC A03/MF A01

This paper reviews major energy products recoverable from solid waste, the marketability of these products, the potential markets, and the status of the technology for recovery. The first section considers the fuels—solid, liquid, and gaseous—that can be created out of solid waste. The second section examines steam and electricity, two other forms in which the energy from solid waste can be sold. In the final section, the various systems and energy products are compared.

Solar Air-Conditioning Study
Apr. '77, 149 pp. English
AD-A043 951/3 PC A07/MF A01

Solar cooling is evaluated to determine performance potentials and life-cycle costs. The heat actuated absorption cycle, Rankine cycle, and desiccant dehumidification cycle are examined. The principles of operation are described, performance coefficients are reviewed, operating constraints are examined, and the commercial status of each approach is evaluated. Savings-to-investment ratios are calculated for solar cooling systems in buildings.

BUSINESS AND ECONOMICS

The Solar Market: Proceedings of the Symposium on Competition in the Solar Energy Industry
Dec. '77, 301 pp. English
PB-282 459/7 PC A14/MF A01

The report is divided into four parts: Competition, consumers, and standards; the developing solar industry—oil company involvement and government programs; the solar market—utilities and small business; and, government involvement in solar energy.

Economics of Greenhouse Tomato Production in the Southeast
Mar. '78, 26 pp. English
PB-278 788/5 PC A03/MF A01

Greenhouse tomato acreage has increased significantly in recent years. An average operation consists of 8,000 square feet covered with polyethylene. Up to three crops can be grown yearly, but two crops (spring and fall) give higher net returns. Investment costs for four 2,000-square-foot plastic greenhouses were approximately $28,000 in 1977. Total annual costs for this size operation with two crops would be $18,117. Using glass or fiberglass would increase the cost. Recent taste tests show a preference for greenhouse tomatoes over field-grown Florida tomatoes, suggesting a higher market price could be commanded.

Economic Growth of the Agricultural Firm
Feb. '77, 65 pp. English
PB-283 836/5 PC A04/MF A01

Contents: Introduction to economic growth of the agricultural firm; theory and method in firm growth research; the setting for firm growth—market, institutional, and legal issues; strategies for growth; community effects of firm growth; firm growth policies under different pollution abatement, production, and financial structures; summary, implications, and emerging growth-related problems.

Designing and Managing Basic Agricultural Programs
1977, 289 pp. English
PB-282 839/0 PC A13/MF A01

Distilling the experience of those countries which have successfully modernized basic agriculture, this volume presents a new delivery system strategy and techniques for management. The system is the whole complex of basic analytical concepts, policy, strategy, tactics, institutions, and procedures for providing all the necessary services that will induce and enable peasants to modernize, or to change from peasant to farmer. This volume presents essential management tools, the concepts underlying these tools, and a series of quantitative techniques and fairly rigorous decision tools.

Comparative Costs of Conditioning and Storing Corn
July '77, 35 pp. English
PB-281 289/9 PC A03/MF A01

The report illustrates an approach for comparing costs of drying and storage by comparing the total costs of the systems. Costs are calculated for two different farm types—cash grain and livestock—to contrast the relevant systems and the cost items that must be included.

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International Symposium of
Feb. 4th, 1976 Guatemala Earthquake
and Reconstruction Process

This report of 72 papers presented by engineers, geologists, seismologists, et. al., has as its main objectives to study the natural techonic causes of earthquakes, in order to prevent similar disasters. Papers deal with different aspects of the earthquakes: history of previous quakes in Guatemala, hazards of building constructions, and application of modern theories to calculate earth pressure. Conclusions and recommendations for reinforcement of bridges and the problem of "lifelines" are studied extensively, resulting in Earthquakes Reduction Programs for the protection of lives, health, property, and welfare.

May '78, 771 pp. Text in Spanish
PB80-112790 and English
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Survey of the Taiwan Market for Industrial Process Controls

Dec. '77, 138 pp. English
DIB-78-05-509 **PC A07/MF A01**

Market research was undertaken to study the present and potential U.S. share of the market in Taiwan for industrial process control instruments; to examine growth trends in Taiwan end-user industries over the next few years; to identify specific product categories that offer the most promising export potential; and to provide basic data to help suppliers determine current and potential sales and marketing opportunities. Trade promotion and marketing techniques were also reviewed.

Public Regulation of Financial Services—Costs and Benefits to Consumers: Phase I Interim Report, Volume I

1977, 172 pp. English
PB-276 186/4 **PC A08/MF A01**

The costs and benefits to consumers of the regulation of consumer financial services are evaluated. Phase I of this study presents an analysis of the industry and the laws and regulations that affect it, chooses regulations for study in Phase II, and develops the appropriate methodology and data bases for their evaluation. The research describes the distribution of consumer financial services, and reviews the major proposals for reform of market structure and consumer protection in financial markets. A comprehensive bibliography of relevant research in the area is included.

The Payments System: Today and the Future

Dec. '76, 60 pp. English
PB-272 554/7 **PC A04/MF A01**

The existing payments mechanism, exclusive of cash and currency, is described. Included are the flows and relationships that would most likely occur if electronic funds transfer were to replace paper-oriented transactions on a widespread basis. Areas of change or impact that would be of economic or behavioral significance if such a replacement were to take place are identified.

Financial Control by Time Absorption Analysis—A Tool for Profit Control

1975, 143 pp. English
PB-282 708/7 **PC A07/MF A01**

Time-absorption analysis is a technique that can be used by all types of businesses for profit control. In this booklet, the author uses a step-by-step approach to introduce this concept and show how to adapt it to a particular business. Topics discussed are: A step toward higher profits; uses; general principles; detailed procedure for the time-absorption method; profit or loss estimation; setting prices; financial analysis of the business; good financial control; retail-wholesale business; manufacturing; service business; and construction and contracting.

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COMPUTERS, CONTROL, AND INFORMATION THEORY

A Low-Cost, General Purpose Data Acquisition and Control System for the PDP-11 Minicomputer

Feb. '78, 23 pp. English
AD-A050 224/5 **PC A02/MF A01**

A general-purpose interface for the PDP-11 family of minicomputers is described. The interface, oriented towards laboratory data-acquisition and experimental control applications, can be built in a relatively short time with low materials costs. A general-purpose, FORTRAN-compatible software package capable of driving the interface is also discussed.

Computer Networks. Analysis and a Case Study Design

June '78, 220 pp. English
AD-A057 906/0 **PC A10/MF A01**

Computer networks are the outcome of the combination of computer and data communications technologies. Part I of this report presents the background of each one of these technologies and describes the principles of computer networking in particular. Part II leads to a comparative analysis of four network architectures. The communications requirements are derived and technologies for implementation of the communications links are recommended.

Urban Traffic Control and Bus Priority System Software Manual. Volume I. Functional Description and Flow Charts

June '76, 401 pp. English
PB-273 430/9 **PC A18/MF A01**

An Urban Traffic Control and Bus Priority System has been implemented in the District of Columbia. The system includes on-street surveillance and control elements and a central office data processing facility. This manual describes the software for this system. This is Volume 1 of 2 volumes which comprise the UTCS/BPS Software Manual.

An Assembly-Language Minicomputer Software Development System

Oct. '77, 23 pp. English
PB-276 108/8 **PC A02/MF A01**

Problems of designing a memory resident software development system for use with minicomputers are presented. A combination editor and assembler program is described; a user's guide is included. Conversion of the assembler into a cross-assembler is discussed.

Programmable Data Communications Controller Requirements

July '77, 61 pp. English
N77-31859/0 **PC A04/MF A01**

The design requirements for a Programmable Data Communications Controller (PDCC), that reduces the difficulties in attaching data terminal equipment to a computer are presented. The PDCC is an interface between the computer I/O channel and the bit serial communication lines. Each communication line is supported by a communication port that handles all line control functions and performs most terminal control functions. The port is fabricated on a printed circuit board that plugs into a card chassis, mating with a connector that is joined to all other card stations by a data bus. Ports are individually programmable; each includes a microprocessor, a programmable read-only memory for instruction storage, and a random access memory for data storage.

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AMTID

APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
(USAID)
Washington, D.C. in cooperation with
National Technical Information Service (NTIS)
an agency of the U.S. Department of Commerce

AMTID 80-5

As another addition to the NTIS Guest editorship series, Constellate Consultants, Ltd., of India, a member of the USAID Technical Information Network, has edited this month's issue.

Dear Friend,

In developing countries, where many cannot afford their own vehicles, mass transportation is the answer to mobility needs. Moreover, rising fuel and maintenance costs, coupled with traffic congestions, are drawing attention to mass transportation. A good mass transportation system helps not only the residents but also the visiting tourists.

The need for information on mass transportation is therefore being increasingly felt. In recognition of this need, I have chosen this subject for this AMTID issue.

Many of the reports covered discuss, at length, the various problems relating to technology choice. Some deal with economic models for the choice of investment levels. A few reports dealing specifically with developing countries have been highlighted.

These reports are indicative of the increasing volume of information in this important field. You may find ordering some of these reports of great help. To know what more NTIS has to offer on this and related subjects, you may order the NTIS Published Searches (complete bibliographies with abstracts), some of which are listed in this issue.

I am sure many of these reports will help us in developing countries to make economically rational choices in transportation technologies and improve mass transportation facilities.

Sincerely

Prithvi Haldea
Guest Editor

PR-603

TRANSPORTATION

Public Transportation Needs of Rural and Small Urban Areas
Oct. '78, 87 pp. English
PB-295 093/9 PC A05/MF A01

The development of a model to predict potential patronage for transit in rural and small urban areas is the subject of this report. The main objective of the study was to develop a methodology useful for determining the location and magnitude of public transportation needs in rural and small urban areas of fewer than 50,000. The methodology suggests utilizing existing and future resources in determining transit needs, in recommending public transportation legislation, and in implementing transportation programs.

Analyzing Transit Options for Small Urban Communities. Volume 1. Transit Service Objectives and options.
Jan. '78, 109 pp. English
PB-291 450/5 PC A06/MF A01

The information and analytical techniques contained in this manual are designed to assist in the planning of new or improved transit services in small urban communities with fewer than 200,000 residents. Techniques are presented to assist in planning, and to estimate the demand, cost, and revenue implications of various transit service alternatives. Volume One presents a generalized process for planning transit and paratransit options in small urban communities. Also contained in Volume One is a summary of the capabilities of specific modal opportunities and their relationship to the achievement of local transit service objectives. A publication list is provided.

Analyzing Transit Options for Small Urban Communities. Volume 2. Analysis Methods.
Jan. '78, 181 pp. English
PB-291 451/3 PC A09/MF A01

Volume Two presents information and techniques designed to assist in the third set of activities in the planning process. This volume describes an evaluation approach and presents detailed techniques for estimating the patronage, cost, and revenue implication of a transit service operation.

Analyzing Transit Options for Small Urban Communities. Volume 3. Summary of Management and Operations Experience.
Jan. '78, 142 pp. English
PB-291 452/1 PC A07/MF A01

Volume Three describes the activities of transit sysetems, identifies arguments for and against local control of transit organizations, estimates staff requirements of various-sized transit systems, and describes the desired characteristics of a transit manager. Numerous data and statistics are given on the financial and operating performance of existing conventional transit and paratransit services in small urban communities.

Intermediate Public Transport in Developing Countries
1977, 23 pp. English
PB-280 521/6 PC A02/MF A01

Intermediate forms of urban public transport used throughout the developing world are surveyed in this report. The controversy surrounding intermediate public transport is discussed and the more important issues and problems are identified. The purpose of the report is to describe the significant role that intermediate public transport performs in the urban sector of developing countries.

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Forecasting Rural Road Travel in Developing Countries From Studies of Land Use
1977, 38 pp. English
PB-277 726/6 **PC A03/MF A01**

In many developing countries, the difficulty of standardizing trip measurements, the flexibility with which vehicles are used, and the absence of a conventional sampling frame for interviewing road users are the main obstacles to forecasting travel from land use. The report suggests that home and workplace questionnaire surveys, focusing on the vehicle owner, may be suitable for the extensive sampling necessary to evolve standards for studies of rural trip characteristics. Definitions of employment suitable for land-use/transport studies in developing countries are suggested in the report.

Opportunities For Cost Reduction in the Design of Transport Facilities For Developing Regions
1970, 403 pp. English
PB-207 520 **PC A03/MF A01**

The document provides the results of an examination of traditional designs of transport facilities in the developing countries with a view to reducing total initial and operating costs, or to reducing costs devoted to the imported elements. The topics include: road cost analysis and design standards; road construction cost model; a road maintenance cost model; opportunities for cost savings in highway engineering design; economics of one-way bridging; potential cost savings in the design of water crossings; potential cost savings in the design and use of ground vehicles; opportunities for cost reductions in aircraft, airways, and airports; potential cost savings in the selection of waterway and harbor techniques, harbors and associated facilities; economic models for choice of transport techniques in developing countries; and trade-offs between construction costs and maintenance costs.

PLANNING BETTER TRANSPORTATION

Control of Service Reliability in Transit Networks
Mar. '79, 127 pp. English
PB-295 525/0 **PC A07/MF A01**

Service reliability is important to both the transit user and the transit operator. This report illustrates the initial phase of a study of various strategies for control of service reliability in transit networks. Specifically, this report focuses on: identification of possible control strategies; development of a bus network simulation model to enable testing of alternative strategies; analysis of the relationship between passenger wait times and service reliability; tests of the effects of network structure on reliability; and preliminary tests of a limited set of control strategies. Major conclusions are: passenger wait time is very sensitive to service reliability; new insights have been gained into the causes of vehicle "bunching" along routes; and a number of potentially useful control strategies have been identified.

Characteristics of Urban Transportation Demand: A Handbook For Transportation Planners
Apr. '78, 129 pp. English
PB-293 220/0 **PC A07/MF A01**

The handbook is intended to guide transportation planners, engineers, and decision makers in: assessing demands for urban, highway, and transit systems; applying and validating conventional transportation planning techniques; and establishing sound transportation planning decisions. It contains characteristics of urban bus, rail, and highway systems, and urban trip making. It provides basic inputs to the urban transportation planning process as well as ways of checking the results for reasonableness and relevance.

Basic Market Research Techniques for Transit Systems
June '78, 93 pp. English
PB-295 079/8 **PC A05/MF A01**

Market research provides the foundation for effective transit service delivery. The critical importance of sound marketing efforts emphasizes the need for a basic guidebook, geared specifically toward the transit industry, outlining the principles and procedures of market research. The major responsibilities of a transit market research activity are to collect data, analyze the needs and preferences of the various target markets, and subsequently, to forecast the potential demand for transit services. Three general approaches to be used in a transit marketing capacity are discussed: (1) sample surveys, (2) field observation, and (3) secondary data analysis. In comprising these three broad procedures, each has strengths and weaknesses which make them distinct methods.

Performance Measures For Public Transit Service
Dec. '78, 115 pp. English
PB-294 955/0 **PC A06/MF A01**

The report identifies definitional, institutional, and technical difficulties associated with developing Transit Performance Measures (TPM's) for use in evaluating public transit service. Contemporary evaluation processes are surveyed and evaluated in terms of their purpose. The procedures used by the Division of Mass Transportation in developing its list of TPM's are described, as well as suggested methods for developing performance standards. The necessity for linking TPM's to funding strategies is also discussed.

Applications of New Travel Demand Forecasting Techniques to Transportation Planning. A Study of Individual Choice Models.
Mar. '77, 163 pp. English
PB-265 718/7 **PC A08/MF A01**

The report documents the application of individual choice travel demand models in urban transportation planning. Three general areas of application are covered: the traditional travel demand forecasting process; short range, transportation systems management evaluation; and patronage and revenue forecasting for new transportation systems. For each application, the suitability of the model is discussed, recent applications are summarized, and two detailed case studies are presented to demonstrate how the models were used. A short primer on individual choice models is included to provide the planner with enough information to understand how the models work and their differences from more conventional planning models. References are given for those who would like to know more about individual choice models.

Demand Responsive Transportation Planning Guidelines (1976)
Oct. '76, 81 pp. English
PB-261 314/9 **PC A05/MF A01**

Demand Responsive Transportation (DRT) is a type of transit operation providing "on-demand," door-to-door service with small buses. There are more than 40 DRT services now operating in the United States, which are used to provide the data base for a set of relationships in the planning and design of new DRT systems. In this study, the guidelines for the new DRT systems are discussed.

Development of Research in the Construction of Transportation Facilities: A Study of Needs, Objectives, Resources, and Mechanisms For Implementation
Sept. '77, 161 pp. English
PB-227 419/8 **PC A08/MF A01**

The report decribes an in-depth research study to evaluate and measure current and projected productivity in construction of transportation facilities; determine areas with highest potential economic returns, and the greatest needs where research could lead to improvements in technology and management; quantify decision-making criteria where possible; assess the present and potential interests and capabilities of institutions that would do such research in transportation construction; and explore improved mechanisms for implementing transportation construction innovations. The study concluded that some of the major obstacles that impact costs, slow productivity, and inhibit the implementation of innovations result from decisions made and policies set during the planning and design phases, and the contractual and organizational structure chosen for project administration.

Development of Research in the Construction of Transportation Facilities: A Study of Needs, Objectives, Resources, and Mechanisms For Implementation. Summary Report.
Sept. '77, 32 pp. English
PB-277 420/6 **PC A03/MF A01**

Specific objectives for the study included the following: Evaluate and quantify the current state of productivity in the construcion of transportation facilities; determine areas having the largest potential economic returns and the greatest needs where research could lead to improvements in technology and management for improved productivity; assess present and potential interests and capabilities of institutions and individuals that could do such research in transportation construction; explore incentives and improved mechanisms for implementing findings that would result from expanded research efforts; develop means for evaluating the impact that policy, contractual, and technical decision-making in the planning and design stages have on capital costs in the construction phase.

Social, Economic, and Environmental Implications in Transportation Planning
1976, 101 pp. English
PB-259 416/6 **PC A06/MF A01**

This report is a compilation of nine papers on the social, economic, and environmental implications of transportation planning.

Public Transportation Planning
1976, 104 pp. English
PB-261 223/2 **PC A06/MF A01**

Contents: urban public transportation goal determination—a research approach; legislative perspectives on the State transportation planning process and transit planning in California; consumer attitudes toward public transit; characteristics, attitudes, and perceptions of transit non-users in the Atlanta region; travel patterns on a new regional rapid transit system—clues from the early stages of operations on BART; forecasting dial-a-bus ridership in small urban areas; forecasting demand for peripheral park-and-ride service; public policy and transit services for handicapped persons; evaluating the relevance of specialized university courses in public transportation; operational planing of fixed-route and demand-responsive bus systems in the Greater Lafayette, Indiana, area.

Transport Improvement, Commuting Costs, and Residential Location
May '73, 33 pp. English
N74-15669/6 **PC A03/MF A01**

A theoretical framework for evaluating the effects of introducing new transportation on residential travel patterns is presented. Data are based on economic factors and on changes in residential location of urban commuters that alter the mode and length of work trips.

Transit Systems Organization and Management Study
Dec. '72, 44 pp. English
PB-226 626/0 **PC A03/MF A01**

A major concern for the Central Ohio Transit Authority is how to manage the transit system for Columbus and Franklin County Ohio, once public ownership occurs. The four principal problems which express this concern are: the form of management that should be established, the question of who should be the managers, the most appropriate form of organization, and the question of how management should relate to the COTA board. The report attempts to solve these problems as well as to provide COTA with recommendations for an action program.

MOVING PEOPLE IN BUSES

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity: Executive Summary

Dec. '78, 27 pp. English

PB-295 220/8 **PC A03/MF A01**

This paper reviews the concepts and definitions of efficiency, effectiveness, and productivity in the public transportation sector, and presents an appropriate framework for the development of a set of performance indicators. It also examines several potential uses of performance concepts as policy tools, management tools, and planning tools. The second section of the paper examines driver productivity issues, and identifies the factors that may have a critical influence on system productivity and operating costs. The third part of the paper analyzes various policies which may lead to the improvement of bus transit operations in small- to medium-sized urban areas.

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity. Part I. Definition and Measurement of Urban Transit Performance

Dec. '78, 173 pp. English

PB-295 221/6 **PC A08/MF A01**

A review of the concepts and definitions of efficiency, effectiveness, and productivity in the public transportation sector is presented in this document. It is brought out that many environmental and policy factors outside the control of the transit operator affect the performance of transit systems. The paper also presents several potential uses of productivity concepts.

A Comprehensive Analysis of Urban Bus Transit Efficiency and Productivity. Part II. Labor Aspects of Urban Bus Transit Productivity

Dec. '78, 115 pp. English

PB-295 222/4 **PC A06/MF A01**

One of the main thrusts in the transit industry today is to gain a clear understanding of productivity and its impact on operations and costs. This document is the second part of a three-part study. Part II provides an examination of the driver productivity issues, and attempts to identify the factors that may have a critical influence on system productivity and operating cost. Three specific productivity measures were considered: vehicle-miles per driver-hour, vehicle-hours per driver, and vehicle-hours per driver-hour. Possible actions that can improve each of these measures were reviewed, and a statistical analysis examined the financial aspects of driver productivity.

Forecasting Bus Transit Operating Costs

Nov. '75, 163 pp. English

PB-262 634/9 **PC A08/MF A01**

This study developed a practical forecasting model for use by transit planners. The model should provide quantitative estimates of operating costs for any proposed bus transit system. The four resource categories for which models were developed are driver labor, bus repair labor, fuel consumption, and oil consumption. A single model is developed for all other operating costs.

The Double-Deck Bus Demonstration Project: Executive Summary

May '78, 48 pp. English

PB-287 838/7 **PC A03/MF A01**

This report is one of three documents evaluating the Double Deck Bus (DDB) Demonstration Project sponsored by UMTA. The project assessed potential increases in vehicle productivity in an express, limited busway service and in regular service. The evaluation considers passenger acceptance/perceptions of the DDB as compared to the conventional bus. Statistics are presented on schedule adherence, dwell times, passenger throughput, vehicle reliability, on-board safety, repair and maintenance costs/capacity mile, and fuel and oil consumption rates. One of the conclusions of the study was that passengers prefer the DDB.

Promoting Off-Peak Hour Bus Ridership

1974, 37 pp. English

PB-239 013/6 **PC A02/MF A01**

This report builds on previous promotional efforts by experimenting with a new inducement for off-peak bus ridership, by using a coupon redeemable for cash. The underlying assumption of the report was that by tempting people who ordinarily use autos for off-peak hour trips into seeking information about the bus system and then in turn using the bus, it could be demonstrated that the bus is a viable alternative to the auto for many off-peak hour trips.

A Systems Approach of Optimal Bus Network Design

Sept. '75, 107 pp. English

PB-266 661/8 **PC A06/MF A01**

Providing the transit planner with better coordination between the decision-makers and the systematic framework of the bus network design is thought to be one way of improving planning efficiency. This report reflects and expands on this view by presenting a new approach for bus network design. The proposed framework of this approach is implemented on a macro-modeling basis, and is comprised of four sub-models: attitude model, network-generating model, prediction model, and evaluation model. Sample applications of this new approach to bus network design are presented using both theoretical viewpoints and empirical analyses.

INFORMATION ON TECHNOLOGY & DEVELOPMENT

PAPEL DE LA TECNOLOGIA EN EL DESARROLLO Y DEPENDENCIA DE LOS PUEBLOS (The Role of Technology on the Development and Dependency of Countries)

Feb. '79, 168 pp. Text in Spanish

The patterns of economic growth which Latin America has experienced throughout the last 20 years are discussed in this report. Attention is given not only to the nutritional problems and their relationship with economics, but also to the philosophical meaning of appropriate technology. Some of the themes studied include: efficiency and justice in the utilization of technology; examples of developing with unappropriate technology; the role of agriculture and sciences and technology of foods. An abundant bibliography, tables, and a few statistics are included.

PB80-169 444 PC A08/MF A01

RAIL TRANSIT

Feasibility Analysis of Urban Transportation Systems With Special Reference to Tunnels
Oct. '77, 460 pp. English
PB-274 372/2 **PC A20/MF A01**

Performance-equivalent bus and rail systems were considered under such various guideway choices as dedicated lanes, medians, aerial structures, new rights-of-way, and tunnels. Analysis was done by determining the average per-passenger cost for each alternative mode and guideway option. Peak-hour demand was projected for each of the 35 largest metropolitan areas based on analysis of 1970 journey-to-work tables and assumptions on future growth and distribution of population and employment. It was found that the decision to prefer tunnels over other choices is highly sensitive to right-of-way costs and the relative costs of tunnel evacuation.

Rail Transit System Cost Study
Mar. '77, 120 pp. English
PB-266 918/2 **PC A06/MF A01**

One task under the Rail Supporting Technology Program of the Urban Mass Transportation Administration has been to assess the cost of constructing, operating, and maintaining three kinds of urban rail systems: light rail, rapid rail, and commuter rail. In this study, cost data from several North American and European transit authorities were collected and analyzed. These data, together with recent personal experience in several transit construction projects, served as the basis of the cost projections. Factors influencing appreciable cost variations in construction and operations were reviewed and included as criteria for cost projections.

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THE ECONOMICS OF WATER REFORM: INSTITUTIONAL DESIGN FOR IMPROVED WATER MANAGEMENT IN THE LDCs

1977, 53 pp. English

The productivity of irrigated agriculture and the importance of equity in irrigated systems are discussed in this report. It suggests that irrigation potentials may be expanded through the construction of new projects, rehabilitation and modification of the infrastructure in existing projects, modification of the operation and maintenance of irrigation infrastructure, and implementation and enforcement of rules and regulations governing the use of irrigation facilities. Also given is a range of possibilities for enlarging and making more equitable the use of existing irrigation water supplies. Illustrations are given of projects in which decisions were made to redesign the infrastructure in order to serve more directly land owned by more powerful irrigators.

PB80-154 404 PC A04/MF A01

Guidebook For Preliminary Assessment of Urban Railroad Problems
Apr. '75, 79 pp. English
PB-245 063/3 **PC A02/MF A01**

This report is the second of four volumes and prepares a methodology for performing future railroad relocation studies. The purposes of Volume 2 are to acquaint community leaders with the problems and opportunities that are presented by planning for railroad relocation, and to enable local government personnel, with assistance from railroad company and highway department sources, to prepare a preliminary estimate of the feasibility for improving a local railroad system.

Systems Analysis of Rapid Transit Underground Construction. Volume I. Sections 1-5.
Dec. '74, 177 pp. English
PB-275 576/6 **PC A09/MF A01**

The relationships and responsibilities of governmental, private, and public groups involved in planning, implementing, and constructing an urban rapid transit system are discussed, as well as the techniques and processes of cut-and-cover and tunnel construction. Environmental impacts of this construction as well as safety and insurance aspects are presented, and physical and institutional controls (sensitivities) on construction are identified.

Systems Analysis of Rapid Transit Underground Construction. Volume II. Sections 6-9 and Appendixes
Dec. '74, 305 pp. English
PB-272 568/4 **PC A14/MF A01**

Three San Francisco Bay Area Rapid Transit (BART) projects and two Washington Metropolitan Area Transit Authority (WMATA) projects are analyzed with respect to time schedules, costs, and sensitivity to physical and institutional controls. These data are utilized in developing generalized models of four specific types of underground construction: cut-and-cover station, Cut-and-cover line, free-air-driven tunnel, and compressed-air-driven tunnel. The models presented are planning tools for evaluating the alternative types of underground construction in a transit system with respect to local costs and physical and institutional controls. Possible future tunneling cost-reduction techniques are discussed and recommendations for further research are made. (Portions of this document are not fully legible.)

Light Rail Transit: Planning and Technology
1978, 176 pp. English
PB-288 949/1 **PC A09/MF A01**

This report contains the technical papers and workshop summaries from the National Conference on Light Rail Transit (LRT) held in Boston, Massachusetts, August 28-31, 1977. The papers deal mainly with the socioeconomic and technical aspects of LRT.

TRAINING FOR MASS TRANSIT

Mass Transit Training Needs. Volume I. Executive Summary.
May '74, 42 pp. English
PB-236 000/6 **PC A03/MF A01**

This report is the first of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This study includes a detailed analy-

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sis of the training requirements; a discussion of the availability of training programs to meet the needs of the industry; an outline of supplementary material needed to bring training programs up to an acceptable standard; and proposals for programs to upgrade the standard of training as it currently exists. Specifically, this volume summarizes the results of an inquiry into industry needs for standardized programs regarding training of bus operators, bus operator instructors, bus mechanics, bus mechanic instructors, and rapid transit rail car repairpersons.

Mass Transit Training Needs. Volume II. History and Methodology.
June '74, 104 pp. English
PB-236 001/4 PC A06/MF A01

This report is the second of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This volume describes the history and methodology of the program. Statistics relating to transit industry training are included.

Mass Transit Training Needs. Volume III. Bus Operator Training Program, Bus Operator Instructor Training Program
July '74, 183 pp. English
PB-236 002/2 PC A09/MF A01

This report is the third of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit needs. This volume is devoted to bus operators and bus operator instructors. A recommended standardized course for bus operators is presented, together with sources of suitable training materials.

ENSURING SAFETY

Bus Interior Design For Improved Safety
Apr. '76, 58 pp. English
PB-252 253/0 PC A04/MF A01

The report describes a project of testing and analysis directed toward finding solutions to the problem of on-board accidents on transit buses. Accident statistics are discussed with respect to the on-board accident problem, the on-board accident scenario, interior hazards and potential design changes, and the deceleration problem. A human factors test procedure, which was developed based upon knowledge gained from an accident data analysis, is described in detail in terms of test objectives, detailed test procedures, and data analysis procedures. Conclusions for urban transit bus safety are also presented.

Transit Safety and Security: A Design Framework
Apr. '76, 170 pp. English
PB-256 518/2 PC A22/MF A01

The study is an analysis of transit crime data for the Southern California region. It examines safety and security deficiencies in transit design, and recommends ways in which they can be improved. Some specific design areas examined are: park-and-ride facilities; parking structures; site planning and landscaping; illumination levels; passenger boarding safety; subway and elevated systems; station visibility; closure and monitoring; traffic and parking criteria; and the special needs of the elderly and handicapped.

Safety in Urban Mass Transportation: Guidelines Manual
May '75, 90 pp. English
PB-245 413/0 PC A04/MF A01

The manual presents a series of organizational and technical safety guidelines designed for use by the transit management community. The guidelines are intended to show how the transit industry—supplier firms and operators—can develop programs that will assure satisfactory operational safety levels.

REPORTS FRON AND ON INDIA

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India, on November 20-30, 1978. Appropriate Technology For a Low-Cost Paper Project to Boost the Rural Economy
Sept. '78, 39 pp. English
PB-294 600/2 PC A03/MF A01

A project to manufacture liner board and corrugating medium to produce corrugated box containers has been identified as essential to boost the rural economy of developing countries. The appropriate technology for this industry is based on the use of agricultural residues for pulp production, the use of less steam, water, and energy for processing, simple process techniques suitable for ease of operation and maintenance, flexibility of operational systems, and reduction of pollution load. As this project is based on agricultural residues, it will have far reaching socio-economic benefits to the rural communities of developing countries.

International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India, on November 20-30, 1978. Medicine For the Rural Population in India
Oct. 6, '78, 53 pp. English
PB-297 203/2 PC A04/MF A01

This document presents ways of providing simple medicaments to the rural population in India. The suggestions, however, are also applicable to rural areas of other developing countries with suitable modifications. The topics covered are indigenous systems of medicine, allopathic home remedies, quality control, distribution systems, capital investments and financial protection, socio-economic benefits, and the present position of the drug industry in India.

Survey of Indian Agro-Bio-Economic and Allied Literature, 1947-1975. A Bibliography. Volume I—Classified Part
1978, 364 pp. English
PB-293 140–0 PC A16/MF A01

This volume is a comprehensive record of Indian publications on the subject of agriculture and agricultural sciences, social sciences, physical sciences, medicine, and economics. The 5000 entries included in the volume represents books, monographs, mimeographed studies, serials and continuations, series publications, and significant pamphlets. This volume is designed according to subject, and the subjects are grouped according to the universal decimal classification scheme.

Water to the Fields: Institutional Innovations in India's Command Area Development Program
Aug. '75, 34 pp. English
PB-294 548/3 PC A03–MF A01

Irrigation development is now receiving high priority in India's agricultural development strategy. This paper describes what is being done in India to effect a number of major institutional changes in canal-irrigated areas, such as realignment of property boundaries, introduction of rotational irrigation, and formation of water users' associations. The paper argues that research on institutional aspects of water distribution is needed not only for understanding the distribution of income and power in rural society, but also for the formation of policies which might make that distribution less unequal.

JAN 7 1981

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AMTID

APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
(USAID) Washington, D.C.
in cooperation with
National Technical Information Service (NTIS)
an agency of the U.S. Department of Commerce

AMTID-80-6

This month's guest editor comes from the Industrial Information Center of the National Autonomous University of Honduras, a member of the USAID Technical Information Network.

Dear Friend,

The continuous price increases of natural gas, and petroleum and its byproducts has motivated worldwide scientific research to exploit other known renewable energy sources which result in substantial savings to the world economy. This is the reason for choosing energy as the principal topic for AMTID.

We have also considered the importance of including articles in the following fields: business & economics in small business, agriculture, and building industry technology, all of which we hope will be useful.

Sincerely,

Patricia E. Durón

Patricia Durón
Guest Editor
CII-UNAH, Honduras

PR-616

ENERGY

Water For Power Plant Cooling
July'77, 54 pp. English
PB-285 126/9 PC A04/MF A01

Future demands for cooling water needed for the production of electrical energy, possible sources of cooling water, including agricultural and municipal waste water, brackish and saline interior water, geothermal water, ground water, and fresh surface water, and the various methods of power plant cooling are discussed. Plans by California electric utilities to obtain supplies of cooling water for four proposed inland power plants are noted.

Methane Generation From Human, Animal, and Agricultural Wastes
1977, 136 pp. English
PB-276 469/4 PC A07/MF A01

Contents: Overview (introduction and history, system description, and economic feasibility of methane production); technology of anaerobic fermentation—state of the art—(biological mechanisms, raw materials and their preparation, product storage and use, residue composition, storage, and use, and public health aspects); technology of anaerobic fermentation; engineering process design (general design considerations, design criteria, operation and maintenance, performance measurement, and safety); research and development needs (general issues, and technical R&D issues).

Fuels From Sugar Crops. Second Quarterly Report
Oct.'77, 167 pp. English
TID-27834 PC A08/MF A01

This report discusses the progress made on both the agricultural and processing aspects of fuels from a biomass gain research program, and the economic factors of ethanol production. Suggestions for appropriate improvements were made. The Reports of Invention filed with the Department of Energy's patent office are provided. Five appendixes are also included.

Conservation of Water, Chemicals, and Energy in Dyeing Nylon Carpet
Nov.'77, 71 pp. English
PB-277 988/2 PC A04/MF A01

Reduction in the requirements for water, energy, and chemicals has been achieved by changes in carpet back dyeing procedures. In this report, a new procedure is discussed in which the spent bath is analyzed, reconstituted to the desired concentration of dyes and auxillary chemicals, and reused. Results suggest that commercially acceptable carpet dyeings can be achieved in recycled dyebaths. Compared with conventional carpet back dyeing, the modified procedures make possible savings of 65 percent in chemical costs, 65 percent in water requirements, and 20 percent in energy requirements.

Investigations of the Rate of Combustion of Wood Residue Fuel. First Annual Report. April, 1976–March 31, 1976
Mar.'77, 11 pp. English
RLO/2227/T22–1 PC A02/MF R01

A test facility was designed and constructed to study the rate of combustion of wood residue fuels. The facility is now being calibrated and made ready for data collection. This report illustrates the test facility, both photographically and schematically. Also, brief discussion is offered concerning the time framework of the project, the present status of the project, list of project participants, level of financial support, and an indication of the interest of agencies and industry in the efforts of this research undertaking.

Designs for Low Energy Houses
Mar.'76, 18 pp. English
PB-276 752/3 PC A02/MF A01

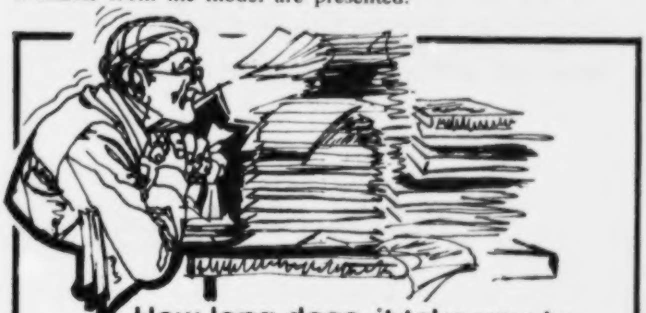
Space heating requirements have been calculated and compared for typical British family housing. The contribution of free heat to space heating is estimated together with the possible contribution of a ventilation heat recovery system. Also included in the report are designs and performance requirements of heating equipment and well-insulated houses.

Contribution to the Analysis of the Development of Unconventional Energy Sources in Latin America
Apr.'77, 32 pp. English
ERDA–tr–298 PC A03/MF A01

Through utilization of its conventional hydraulic and fossil resources, it is felt that the energy demand for Latin America will be satisfied by the end of this century. Nuclear energy will experience a great development in Argentina, Brazil, and Mexico in the coming 20 years. This report discusses the development of wind energy, thermal gradient of the ocean, solar energy, photovoltaic cells, processes of photosynthesis, MHD energy, geothermal energy, and tidal power as energy sources.

An Optimization Study of a Low Thermal Potential Power System
June'76, 110 pp. English
AD–A028 505/6 PC A06/MF A01

A power-generating system using the low thermal potential available from the vertical temperature distribution of the ocean is analyzed as a combined engineering and economic mathematical model. Examples of the kinds of engineering and cost information available from the model are presented.



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Markets and Technology for Recovering Energy From Solid Waste
1974, 37 pp. English
PB–253 326/3 PC A03/MF A01

This paper reviews the characteristics of the major energy products recoverable from solid waste, the marketability of these products, the potential markets, and the status of the technology for recovery. The first section considers solid, liquid, and gaseous fuels that can be created out of solid waste. The second section examines steam and electricity, two other forms in which the energy from solid waste can be sold. In the final section, the various systems and energy products are compared.

Conversion of Solid Waste to Fuels
Jan.'76, 33 pp. English
AD–A021 655/6 PC A03/MF A01

In this report, methanol and polymer gasoline were identified as economical and practical processes for recovering energy from solid waste. Studies were also conducted to determine what effect population and energy market value have on fuel costs.

Energy Conversion Alternatives Study (ECAS). Westinghouse Phase 1. Volume 11: Advanced Steam Systems
Feb.'76, 315 pp. English
N76–23702/3 PC A14/MF A01

A parametric analysis was made of three types of advanced steam power plants that use coal in order to compare their costs of electricity. While the three plant types had comparable energy costs, the pressurized fluidized bed boiler plant had the lowest energy cost. The report recommends that this plant be designed in greater detail to more accurately determine cost and performance levels, and also to ascertain problem areas which will require development efforts. Also considered in the analysis are population control measures for particulate emissions from stack gases.

Biological Conversion of Organic Refuse to Methane
Sept.'75, 153 pp. English
PB–247 751/1 PC A08/MF A01

This report discusses the biological conversion of solid waste to methane by anaerobic fermentation, a method by which energy can be reclaimed. Results of an investigation of refuse fermentation at a thermophilic operating temperature of 60C are provided, and a mathematical simulator of the fermentation process, vacuum filtration process, shredding and separation process, and residue disposal process are discussed. Results from the simulator runs are presented.

Systems Study of Fuels From Sugarcane, Sweet Sorghum, and Sugar Beets. Volume I. Comprehensive Evaluation. Task 77, Final Report.
Mar.'77, 169 pp. English
BMI–1957 (V.1) PC A08/MFA01

Results of a comprehensive evaluation of sugar crops as renewable resources for production of fuels and chemical feedstocks are reported. Volume I contains the general systems analysis of using sugar crops as raw materials for production of fuels and chemical feedstocks, along with a discussion of the major issues affecting the feasibility and implementation of this concept. Also discussed are the development and demonstration needs relating to the use of sugar crops as renewable resources for the manufacture of fuels and chemical feedstocks.

SOLAR ENERGY

Analysis, Design, Fabrication, and Testing of Moderately Concentrating Solar Energy Collectors. Semiannual Progress Report. June–November 1976
Dec.'76, 32 pp. English
ORO–5100–1 **PC A03/MF A01**

The overall objective of the proposed work is to aid in the development of low-cost, moderately high temperature solar energy collectors, which can be achieved by moderate concentration in a groove-like geometry. Previously, a class of solar collectors consisting of east-west aligned trapezoidal grooves was examined while two prototype collectors were fabricated and tested. The specific objective of the report is the further development of the design, and the proof of the concept through testing.

Utilization of Solar Energy, in Developing Countries: Identifying Some Potential Markets
Feb.'78, 13 pp. English
N78–29578/9 **PC A02/MF A01**

The potential use of solar electricity generated from photovoltaic cells is examined for 19 developing nations. Energy and economic profiles are summarized for each country, and a comparison is made between the use of autogeneration and photovoltaics in a rural area of Haiti.

Solar Technology Applications: A Survey of Solar Powered Irrigation Systems
Apr.'78, 46 pp. **PC A03/MF A01**

Published information on solar powered irrigation systems, thermal solar systems, thermoelectric solar systems, and photovoltaic solar systems are presented. Also included in the report are a bibliography and survey of ongoing work.

Feasibility Study of Solar Energy Utilization in Modular Integrated Utility Systems
June'75, 187 pp. English
N75 28518/9 **A09/MF A01**

The feasibility and benefits of solar thermal energy systems on integrated utility systems were evaluated in terms of identification of potential system concepts, evaluation of hardware status, and performance of weighted system evaluations in order to select promising system concepts deserving further study.

WIND ENERGY

Industrial Applications of Solar Energy. Quarterly Report.
Jan.'77, 255 pp. English
SAN/1132–1 **PC A12/MF A01**

The objective of this program was to define solar energy systems that are technically and economically feasible and that can satisfy all or part of selected industry demands, and to determine the market potential of such systems.

Solar Energy Systems for Manufactured Housing
1976, 14 pp. English
LA–UR–76–2094 **PC A02/MF A01**

The opportunities for solar energy utilization and the market situation for solar energy in manufactured housing are discussed, and the general characteristics of the manufactured housing industry are described. Special problems of the utilization of liquid heating collectors, air heating collectors, or passive types of solar heating systems in manufactured housing are considered.

NOW AVAILABLE FROM NTIS

Institutionalization of Rural Credit in India: A Focus on the Cooperative Credit Movement

Since the turn of the 20th century, there has been an effort in India to replace the moneylender with institutionalized forms of rural credit.

The Government of India has relied on the Cooperative Movement in its effort to institutionalize the supply of rural credit. This thesis examines some of the major problems and obstacles encountered, as well as corrective measures taken, with respect to the cooperative movement.

AD-A083 956/3 PC A07/MF A01

Development of a Wind Energy Site Selection Methodology. Final Report, May 3, 1975–June 3, 1977
June'77, 206 pp. English
RLO–2440–11 **PC A10/MF A01**

This report describes progress during the second phase of a planned three-phase program to develop an improved wind energy conversion systems (WECS) siting methodology. The second phase involves model improvement, development of the methodology, and a preliminary site survey demonstration study. The goal of the program is the development of a practical and workable wind energy prospecting and surveying tool.

Wind Energy Mission Analysis. Executive Summary
Oct.'76, 32 pp. English
SAN/1075–1 **PC A12/MF A01**

The Wind Energy Conversion Branch of The Energy Research and Development Administration studied the economic viability of wind energy conversion systems (WECS). The results of this study are condensed and summarized in this executive summary to provide an overview of over 850 pages of report and appendixes, and over 1,000 papers of processed wind data.

Wind Energy Mission Analysis. Appendix.
Apr.'76, 268 pp. English
SAN/1075–1–2 **PC A12/MF A01**

Appendixes include information on the average power density of the wind for the United States and its territories, characteristics of the vertical axis machine, structural analysis details, aerodynamic analysis, cost factors for WTG cost model, evaluation of utility applications, industrial cost of electricity, national impact of WECS, public acceptance, and environmental issues.

The Application of Wind Energy Systems to Desalination
Apr.'77, 68 pp. English
PB–276 174/0 **PC A04/MF A01**

The impact of rapidly increasing fuel costs has all but made saline water conversion uneconomical; however, the application of wind energy systems to membrane processes for brackish water conversion offers an economical solution. This report discusses in detail brackish water conversion.

Fabrication and Assembly of the ERDA/NASA 100 Kilowatt Experimental Wind Turbine
Apr.'76, 30 pp. English
N76–21703/3 PC A03/MF A01

As part of the Energy Research and Development Administration (ERDA) wind-energy program, NASA Lewis Research Center has designed and built an experimental 100-kw wind turbine. This report discusses the design and assembly of the wind turbine which were done at Lewis from components procured from industry.

A New Wind Energy Conversion System
Nov.'75, 16 pp. English
N76–20629/1 PC A02/MF A01

Because it is presupposed that vertical axis wind energy machines will be superior to horizontal axis machines on a power output/cost basis, the design of a new wind energy machine is presented to assist torque development. The design employs conical cones with sharp lips and smooth surfaces to promote maximum drag and minimize skin friction on a vertical axis.

Innovative Wind Machines
Sept.'75, 160 pp. English
PB–252 617/6 PC A08/MF A01

This report describes theoretical and experimental research concerning the evaluation of two concepts for wind (energy conversion) machines. The first concept includes a partial review of available papers on the subject of wing trailing vortices, and some calculations concerning the anticipated output of such a device. The second concept described is a vertical axis panemone device with circulation controlled airfoils for the blades. A preliminary theoretical analysis has shown the effect of different design features on its operation, and has led to the design of a test model. The configuration, instrumentation, and control systems of the test model are discussed. Also contained is an outline for a more exact flow theory.

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SERIS P451 519

Report of the Alcohol Fuels Policy Review
DOEPE 0012 PC A07/MF A01

An Inexpensive Economical Solar Heating System for Homes
N762 767–1 PC A04/MF A01

Fuels from Sugar Crops: Systems Study for Sugarcane, Sweet Sorghum, and Sugar Beets
TID 22781 PC E02/MF A01

Passive Solar Design Handbook
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Introduction to Solar Heating and Cooling Design and Sizing
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Minimum Energy Dwelling (MED) Workbook: An Investigation of Techniques and Materials for Energy-Conscious Design
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PB 297 958 PC E04/MF A01

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PB80–138 332 PC A07/MF A01

Survey of Industry on the Use of Food Additives (1977)
PB80–113 418 PC E19/MF E05

Wind Machines
Oct.'75, 85 pp. English
PB-249 936/6 PC A05/MF A01

This report surveys the viability, history, taxonomy, and future potential of various types and sizes of wind machines that might be used to help meet future U.S. energy demands. It also discusses various applications of wind machines, siting problems, performance characteristics, and system designs. A glossary of commonly used words and phrases, a list of suppliers, and a selected bibliography are included.

BUILDING INDUSTRY TECHNOLOGY

Handbook for Design: Specially Adapted Housing
Apr.'78, 69 pp. English
PB-284 846/3 PC A04/MF A01

The pamphlet provides assistance in designing and producing the best possible home for the physically handicapped. Due to the wide range of possible designs and the often unique needs of the physically handicapped, it is difficult to formulate precise design requirements; therefore, most criteria presented should be considered only as recommendations. The majority of the criteria presented relates to specific design details, such as site considerations and entrances, floor plans, bathrooms, kitchens, and interior details.

Construcciones Resistentes Al Fuego—En El Hogar—y En La Granja (Fire Construction of the Home . . . of Farm Buildings)
1968, 31 pp. Text in Spanish
PB-292 746/5 PC A03/MF A01

Precautionary measures for the construction of fire-resistant homes, barns, silos, and other buildings are outlined, along with the construction design for additional fire barriers. Also covered is the installation and fire-proofing of gas and oil furnaces, floor registers, wood burning stoves, lightning rods, and electrical wiring. Because of the number of fires caused by spontaneous combustion and unsafe drying and/or heating methods in the stable, tobacco barn, grain elevator, poultry house, or workshop, their proximity to equipment and other farm buildings and their fire barriers are examined.

Opening Papers: Theories of Fibre Cement and Fibre Concrete
1975, 16 pp. English
AD-A049 702/4 PC A02/MF A01

Theoretical models of cementitious materials reinforced with either continuous or discontinuous strong and stiff elastic fibers are discussed in this paper. Conditions for improved first-crack strength and post-cracking behavior in such composites are considered, and uncommon problems encountered in the fracture toughness testing of such composites are clarified.

Production Methods and Applications For Concrete Polymer Materials
Mar.'77, 12 pp. English
BNL-22640 PC A02/MF A01

Concrete polymer materials are being used worldwide in applications where high strength and durability are required. This report discusses methods for producing polymer concrete and polymer-impregnated concrete and summarizes their structural and durability properties. Existing and potential applications for these materials, such as for chemical storage tanks, pilings, pipe, curbstones, and bridge decks, are reviewed.

Reliability Basis of Load and Resistance Factors For Reinforced Concrete Design
Feb.'78, 102 pp. English
PB-277 670/6 PC A06/MF A01

Reliability methods are employed in this study to facilitate the selection of criteria for reinforced concrete design. These methods, which are based on probability theory, provide a logical basis for determining the manner in which uncertainties in resistance and loads affect design safety and how their effects should be controlled in building standards. Safety indexes associated with existing reinforced concrete design are evaluated, and design criteria commensurate with levels of uncertainty and required reliability are presented.

AGRICULTURE

International Forum on Appropriate Industrial Technology Held at New Delhi/anand, India, on November 20–30, 1978. Appropriate Technology For Production of Sugar and Other Sweetening Agents
Sept.'78, 34 pp. English
PB-294 677/0 PC A03/MF A01

Different technologies for the production of various sweetening agents such as gur, khandsari sugar, plantation white sugar, raw sugar, refined sugar, etc. are described in detail in this paper. The financial and technical skill requirements for various technologies are outlined, and the parameters required for adoption of a technology are indicated. It points out that the vacuum pan technology for producing plantation white sugar is the least expensive, and is ideally suited for developing countries.

Training Manual For Rice Production
1976, 147 pp. English
PB-294 130/0 PC A07/MF A01

This manual contains lessons on rice production skills.

Production of Sugarcane and Tropical Grasses as a Renewable Energy Source. Third Quarterly Report, December 1, 1977–February 28, 1978
1978, 55 pp. English
ORO-5422-3 PC A04/MF A01

Tropical grasses from Saccharum and related genera are being evaluated as candidates for intensive production of solar-dried biomass. This report categorizes the candidate grasses into short, intermediate, and long-rotation crops for co-production with conventional food commodities, and evaluates the possibility of their being used as biomass sources.

Handbook on Agricultural Techniques For State Farms
Nov.'78, 323 pp. English
JPRS-72242 PC A14/MF A01

This report contains information on the Chinese agricultural techniques of seed propagation, crop rotation and cultivation, and agricultural machinery.

Approaches to the Design of Agricultural Development Projects. A Program of Advanced Studies in Institution Building and Technical Assistance Methodology Design Study
Jan.'77, 18 pp. English
PB-282 836-T PC A02/MF A01

This study identifies three possible approaches to the design of agricultural development projects, and presents a set of six factors which appear to have important effects upon the chances for a project's success. Alternative approaches for the project designer are also presented.

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Estafeta Universitaria
Universidad de Panama
Panama City
Tel. 23-9985

Paraguay

Instituto Nacional de Tecnologia y Normalizacion (INTN)
ATTN: Dr. Jose Martino
Avenida General Artigas y General Roa
Casilla de Correo 967
Asuncion
Tel. 290-160, 290-266

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Novoa Ingenieros
Division NTIS
Los Colibries 104
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Tel. 402445

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ATTN: Jesus Fragante
TRC Building
Buendia Avenue Extension
Makati, Metro Manila
Tel. 859811 to 26

Sri Lanka

National Science Council of Sri Lanka
Sri Lanka Scientific and Technical Information Center
ATTN: Mr. N.U. Yapa,
47/5 Maitland Place
Colombo 7

Sudan

The National Council for Research
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Tanzania Research Information Service (TANRIS)
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Thailand Management Association (TMA)
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Improved Practices in Corn Production. A Guide For Peace Corps Volunteers
Mar.'76, 50 pp. English
PB–263 840/1 **PC A03/MF A01**

Contents: some handy conversions; the package approach to improving crop yields; some important facts on corn; use high yielding varieties; select seed carefully for planting; treat seeds with a fungicide; improved plant populations and spacing; use fertilizer; control insects; control weeds; reduce storage losses.

Agronomic Practices For Optimizing the Yield Potential of Short-Statured Rice Varieties in Latin America
Oct.'71, 47 pp. English
PB–219 713 **PC A03/MF A01**

This paper illustrates specific cultural practices as examples of the kind of information needed for optimizing yields in each rice-growing area throughout Latin America. Time of planting in relation to weather patterns is discussed for upland rice and irrigated rice. Planting systems, seed density, and spacing are explained for upland rice systems, direct seeded-irrigated systems, and transplanted systems. Nitrogen response and response to other nutrients are described under rice fertilization. Weed control and harvest timing are included as important cultural practices. Examples of cultural practice interactions, total production costs and revenues, and the effects of nitrogen levels are provided under economic considerations.

Cotton Ball Rot. Laying Out a Trial of a Method of Control (La Pourriture Des Capsules Du Contonnier: Essai de Mise en Place D'une Methods De Lutte)
1975, 152 pp. English
PB–249 731/1 **PC A08/MF A01**

In recent years, progress in the cultivation of cotton has been very marked; however, growers remain defenseless against the damage caused by boll rot. The object of this study is to perfect a method of control to limit the boll rot damage. The present study proposes to define the different type of damage suffered by the fruit, to identify the organisms responsible and their mode of penetration, to define the obstacles the boll presents to the attack of parasites, and to explain the principles of a method of control.

BUSINESS & ECONOMICS IN SMALL BUSINESS

Small Business Management Series Number 35. Franchise Index/Profile. A Franchise Evaluation Process.
1973, 59 pp. English
PB–282 736/8 **PC A04/MF A01**

This book is presented as an aid to those who have decided to invest in franchises. The materials presented are an index of basic information one should know before investing, so that a valid determination about the franchise can be made in terms of both money returns and its future.

Small Business Management Series No. 15. A Handbook of Small Business Finance
1975, 69 pp. English
PB–282 726/9 **PC A04/MF A01**

Contents: what is financial management; financial statements; ratio analysis of financial statements; the different types of financing; unsecured borrowings for working capital; secured working capital financing; secured growth capital financing; the Small Business Administration; and SBIC's and other sources of venture capital.

The Study of Small Business. Part I.
June'77, 111 pp. English
PB–282 711/1 **PC A06/MF A01**

The role of small business, the effectiveness of Federal subsidy and assistance programs, the costs and effects of government regulation, the impact of the tax structure, the ability of financial markets and institutions to meet small business credit needs, the availability and delivery of financial assistance to minority enterprise and recommendations to assist minority business, and a determination of the desirability of developing criteria for defining small business are examined in this study. It also addresses the needs and problems of many small enterpreneurs by making recommendations designed to strengthen the role of small business in the American economy.

Innovative Financing Banks and Energy Conservation. Final Report.
Oct.'77, 113 pp. English
SAN/1201–1 **PC A06/MF A01**

This report describes the results of a project examining what can be done by commercial banks to encourage energy conservation in existing residences. The report is organized in a question-and-answer format, including 10 questions dealing with observations about the marketplace for conservation programs; attitudes and operations; what banks are doing in energy conservation now; and finally, issues relevant to the policymaker in DOE and in the banking industry.

Small Business Management Series No. 3. Third Edition, Human Relations in Small Business
1969, 42 pp. English
PB–282 727/7 **PC A03/MF A01**

In the business world, human relations involves finding and selecting a working staff, developing workers, and guiding and motivating them in the direction of management's goals. Because well-planned action is much more valuable than a problem-solving approach, worker-management relations become more important than ever. For this reason, such topics as human relations in small business; worker morale; orientation and induction; training; and continuing personnel relations are discussed.

Mathematical Methods For Use in Planning Regional Wastewater Treatment Systems
Nov.'77, 180 pp. English
PB–276 660/8 **PC A09/MF A01**

A mathematical method is presented that deals with regionalization of wastewater systems, a complex public sector planning problem. The method focuses on generating alternative physical plans efficiently and systematically, so that planning issues other than economic efficiency may be integrated into the process of comparing alternative plans. An application of the method to a realistic example problem is presented, and the interpretation of imputed values is discussed.

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APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
(USAID)
Washington, D.C. in cooperation with
National Technical Information Service (NTIS)
an agency of the U.S. Department of Commerce

AMTID–80–7 PR-621

Dear Friend,

The development of small business and small-scale industry plays an important role in the economic growth of developing countries. Not only will this build up national infrastructure, but it will also generate new employment opportunities for both skilled and unskilled labor.

The reports featured in this issue of AMTID devote particular attention to starting up and managing small businesses and small-scale industries. The publications listed cover many different subject areas such as accounting and bookkeeping processes, personnel training, employment generation, and management functions.

Also included in this month's issue of AMTID is a special section on Plant Requirements. Because of the age of the reports, the cost figures are outdated; however, the rest of the information should be helpful if you are planning on starting up or maintaining industrial businesses.

Sincerely,

Annette Tuebner
Editor

SMALL BUSINESS SMALL-SCALE INDUSTRY

Design, Operation, and Economics of a Small-Scale Hatchery for the Larval Rearing of Sugpo, "Penaeus Monodon" FAB
July '78, 35 pp. English
PB-297 484/8 PC A03/MF A01

This report discusses the problems associated with the mass production of sugpo, and how the Barangay Hatchery Project scaled down a large tank hatchery technology to a level which can be adopted by the private sector with a minimum of financial and technical assistance.

Accounting and Bookkeeping For The Small Building Contractor
1978, 196 pp. English
PB-297 365/9 MF A01

The book is the first in a series of publications written to help small contractors in developing countries establish and effectively run businesses. Topics include: keeping records; assets and liabilities; basic bookkeeping analysis; fixed assets; depreciation; balance sheets; profit and loss accounts; reading and comparison of accounts; and practical exercises. (Available in microfiche copies only).

Financial Planning For The Small Building Contractor
1979, 192 pp. English
PB-297 376/6 MF A01

This book is the second in a series of publications designed to provide ideas and techniques for good business management. Topics include: planning the year's work; job programs; cash flow; investment decisions; billing procedures; saving time and money; and work study techniques. (Available in microfiche copies only).

Small Enterprises in Developing Countries: Case Studies and Conclusions
1979, 111 pp. English
PB-297 369/1 MF A01

The publication includes over 20 case studies of problems encountered by small businesses in various developing countries. There are individual commentaries on the studies and a general discussion of the factors which determine the success or failure of a small business. (Available in microfiche copies only).

Business Arithmetic for Cooperatives and Other Small Businesses; A Basic Manual for the Employees of Primary Cooperative Societies
1977, 89 pp. English
PB-297 367/5 MF A01

This manual can be used as an accounting training manual, specifically designed for those involved in running cooperatives or small business. Part I covers elementary arithmetic, while Part II covers all the accounting processes necessary in running a business. (Available in microfiche copies only).

Creer Et Gerer Une Petite Entreprise De Construction (Starting and Managing a Small Building Business)
1962, 113 pp. Text in French
PB-294 415/5 PC A06/MF A01

Everything a new entrepreneur needs to know about starting a business is thoroughly discussed in this handbook. Some of the topics covered include business structure, risks, capital management, mortgages, credit sources, business law, permits, building codes, insurance, employee relations, stock management, publicity and advertising, sales, examples of several business construction failures and successes, future planning, land purchase, and management. A special section is devoted to sources of further information.

Establishment of National Employment Services in Developing Countries
Sept. '68, 197 pp. English
PB-286 581/4 PC A03/MF A01

The principal steps which would be involved in starting an employment service are listed in this handbook. Suggestions are given on ways of providing employment services without opening costly employment offices.

The Study of Small Enterprise in the Economy: Summary
June '76, 79 pp. English
PB-282 703/8 **PC A05/MF A01**

Contents: Private enterprise in the economy—Historical background; The problems inherent in a small business; The national interest in small business; The Small Business Administration—Agency mission and programs; A more effective program for the future—Credit and equity funding for small business enterprises; Innovation and new business formation; Government procurement regulations and practices; Management assistance; Minority enterprises and their special problems.

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MF indicates Microfiche, which requires special equipment for viewing.

Both PC and MF have corresponding codes which can be found on the ordering page in Price Schedule A.

The Economics of Rural and Urban Small-Scale Industries in Sierra Leone
1976, 142 pp. English
PB-268 493/4 **PC A07/MF A01**

This report summarizes and describes the major findings and conclusions of research done on Sierra Leone's small-scale industry. The primary objectives of the research were to provide a descriptive profile of small-scale industry to analyze the key determinants of the demand for and supply of output and employment generated by these industries, and to examine the efficiency of the major policies influencing small-scale industries.

Employment Generation Through Stimulation of Small Industries
Feb. '75, 98 pp. English
PB-248 349/3 **PC A05/MF A01**

The primary objective of this program is to strengthen employment generation through the expansion of the small industry sector. The program is particularly relevant to massive unemployment and rural-to-urban migration problems in many developing countries, and is integral to the institutional commitment to international education and development.

Employment Generation Through Stimulation of Small Industries. Guide to International Statistical Sources and National Development Plans at the International Development Data Center
Oct. '74, 41 pp. English
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This guide is the result of an inventory of publications to determine gaps in the collection of the International Development Data Center (IDDC). The results provide two major benefits—the first is the development of a guide to the present statistical resources in the IDDC collection, while the second is the creation of a checklist for futre acquisitions in areas where gaps are apparent.

Employment Generation Through Stimulation of Small Industries. Improving the Productivity of a Small Industry in Rural Korea
Dec. '74, 41 pp. English
PB-248 346/9 **PC A01/MF A01**

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Proceedings of the Conference and Seminar on Techniques and Methodologies For Stimulating Small-Scale Labor-Intensive Industries in Developing Countries, Held at Atlanta, Georgia, on March 10-14, 1975
Sept. '75, 295 pp. English
PB-248 338/6 **PC A13/MF A01**

The principal goals of the conference were: to identify, analyze, and compare existing methodologies designed to stimulate small-scale industry; to disseminate knowledge about operational and linkage efforts; to establish the necessary links for coordination of future efforts of both the organizations in the developing countries and international development organizations; and to establish adequate feedback mechanisms for the present and future in order to enhance the design and utilization of the small industry program.

An Economic Evaluation of Apprenticeship Training in Western Nigerian Small-Scale Industries
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This study evaluated the structure, conduct, and performance of the apprenticeship system in Nigeria. Findings of the study show that the apprenticeship system provides other sectors of the economy with skilled workers in addition to training new entrepreneurs. The study suggests that training under the apprenticeship system be incorporated into national manpower policies. Tables providing statistical information are included.

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Oct. '78, 50 pp. English
PB80-154230 PC A03/MF A01

The paper deals with conditions in the "informal sector" in East Africa, and concentrates on the following three case studies: the UTUNDU program—a program specifically designed to promote the village blacksmiths of Tanzania; the fishery program—a soft technology solution to an integrated small scale fishery set-up for tropical coastal societies; and a program whereby know-how, technology, management, etc., from an industry in an industrialized country are transferred to a similar industry in a developing country.

MANAGEMENT

Management Audit For Small Manufacturers
1977, 49 pp. English
PB-282 707/9 PC A03/MF A01

Management audit is an outline for self-appraisal in business operations. The technique can be applied to almost any enterprise in which functional operations are a critical factor in efficiently producing goods or services. In this booklet, the following areas are covered: production and operations; plant and equipment; accounting, budgeting and expense control; cash management, management and organization; laws, regulations, and taxes; risk and insurance; credit management; systems and procedures; outside consultants and resources; inventory control and management; purchasing, marketing and sales promotion; work and time standards; pricing; and research and development.

Science and Technology For International Development: A Selected List of Information Sources in the United States and Bibliography of Selected Materials (Second Edition)
Feb. '75, 124 pp. English
PB-243 701/0 PC A06/MF A01

This report is part of a continuing effort to identify and document the services of relevant information sources in the United States which may be useful to scholars and practitioners working on policies for science and technology in developing countries.

Improving Management of Farmer Cooperatives
June '64, 55 pp. English
PB-289 987/0 PC A04/MF A01

The publication demonstrates how management principles apply to local cooperatives, and how they can be used successfully to manage cooperatives. The report examines tools such as records and accounts, illustrates techniques that can help put management principles into practice, and suggests ways of performing different management functions.

Designing and Managing Basic Agricultural Programs
1977, 289 pp. English
PB-282 839/0 PC A13/MF A01

This volume presents a new delivery system strategy and techniques for managing modernized basic agriculture. It discusses services that will induce and enable peasants to modernize. It also examines essential decision and management tools and the concepts underlying these tools.

Systems Analysis and Operations Research: A Tool For Policy and Program Planning For Developing Countries
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The report provides an explanation of systems analysis methodology and limitations, illustrative applications of SA/OR (systems analysis/operations research) in decision making, requirements for implementing SA/OR organization in developing countries, processes for training and criteria for producing needed personnel, and technical assistance opportunities.

Creer Et Gere Une Petite Enterprise De Comptabilite (Starting and Managing a Small Bookkeeping Service. The Starting and Managing Series, Volume 4)
Jan. '62, 67 pp. French
PB-286 590/5 PC A04/MF A01

This booklet can be used as a manual for those interested in starting a bookkeeping service.

Preparing, Evaluating, and Managing Development Projects
May '73, 583 pp. English
PB-294 901/4 PC A25/MF A01

This manual provides a methodology for developing projects at the ministerial level by both professional and administrative personnel; as well as guidelines for analyzing projects. An international bibliography of development projects is also included.

Quick Bibliography Series: Training, Management and Evaluation of Extension Work, 1970-1978.
Apr. '78, 44 pp. English
PB-294 184/7 PC A03/MF A01

The bibliography contains 278 citations on training, management, and evaluation of extension work.

Creer Et Gere Un Petit Restaurant (Starting and Managing a Small Restaurant). The Starting and Managing Series. Volume 9
Jan. '64, 124 pp. English
PB-286 614/3 PC A06/MF A01

The booklet is designed to help prospective restaurant owners decide whether they have the basic qualifications, financing, and experience for success. It describes the advantages and disadvantages of the business, the risks involved, and management practices that will contribute to success.

Small Business Management Series Number 36. Training Salesmen to Serve Industrial Markets
1975, 91 pp. English
PB-282 731/9 PC A05/MF A01

The booklet discusses the role of sales in the overall marketing program of a small manufacturer. It offers suggestions that salespeople can use in servicing industrial customers, and provides the owner-manager with specific material for use in a training program. Topics discussed are: the successful small firm is customer oriented; coordinated marketing for profit; the salesperson's job; training your salespeople; buying is decision-making—selling is sound guidance; and selling as a service.

Small Business Management Series No. 15. A Handbook of Small Business Finance
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May '73, 583 pp. English
PB-294 901/4 PC A25/MF A01

This manual provides a methodology for developing projects at the ministerial level by both professional and administrative personnel; as well as guidelines for analyzing projects. An international bibliography of development projects is also included.

Quick Bibliography Series: Training, Management and Evaluation of Extension Work, 1970-1978.
Apr. '78, 44 pp. English
PB-294 184/7 PC A03/MF A01

The bibliography contains 278 citations on training, management, and evaluation of extension work.

Creer Et Gere Un Petit Restaurant (Starting and Managing a Small Restaurant). The Starting and Managing Series. Volume 9
Jan. '64, 124 pp. English
PB-286 614/3 PC A06/MF A01

The booklet is designed to help prospective restaurant owners decide whether they have the basic qualifications, financing, and experience for success. It describes the advantages and disadvantages of the business, the risks involved, and management practices that will contribute to success.

Small Business Management Series Number 36. Training Salesmen to Serve Industrial Markets
1975, 91 pp. English
PB-282 731/9 PC A05/MF A01

The booklet discusses the role of sales in the overall marketing program of a small manufacturer. It offers suggestions that salespeople can use in servicing industrial customers, and provides the owner-manager with specific material for use in a training program. Topics discussed are: the successful small firm is customer oriented; coordinated marketing for profit; the salesperson's job; training your salespeople; buying is decision-making—selling is sound guidance; and selling as a service.

Small Business Management Series No. 15. A Handbook of Small Business Finance
1975, 69 pp. English
PB-282 726/9 PC A04/MF A01

Contents: What is financial management; Financial statements; Ratio analysis of financial statements; The different types of financing; Unsecured borrowings for working capital; Secured working capital financing; Secured growth capital financing; The Small Business Administration; SBIC's and other sources of venture capital.

Small Business Management Series No. 32. Financial Recordkeeping for Small Stores
1976, 42 pp. English
PB-282 739/2 PC A03/MF A01

This basic recordkeeping system is designed for the small store owner-manager whose business does not justify hiring a trained, full-time bookkeeper. This system accomplishes three purposes: maintain a record of all transactions of the business; protect the assets of the business from errors, fraud, and carelessness; and provide a basis for business planning by showing the results of past decisions and furnishing the facts needed for future decisions.

Problems in Business Management. Nature and Scope of Management Responsibilities
Jun. '62, 34 pp. English
PB-292 990/9 PC A03/MF A01

This report presents information on the principles and techniques of modern management. Topics discussed are: the employer's duties; the personality of the enterprise director; organization of the enterprise; personnel training, human relations, production, sales, and financing.

Manual de Administracion para la Industria del Vestuario (Administrative Manual for the Clothing Industry)
1976, 342 pp. Spanish
PB-290 423/3 PC A15/MF A01

The manual was written to provide businesspeople in the garment industry with methods and recommendations designed to improve their management techniques. Special attention is devoted to production, financing, sales, and marketing methods. Details are provided to set up an accounting system covering profit and loss, cost analysis, credit and/or cash sales, monthly reconciliation of bank statements, and statement of net worth. Graphics explain planning and controlled production, sales campaigns for special holidays and seasonal events. Quality control and time-and-motion studies are provided for garment cutters.

SORRY FOR THE INCONVENIENCE . . .

It has come to our attention that issue 79-10 had order number/price code errors. Please note corrections:

Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions. Volume 1.
PB 195 597 PC A10/MF A01

Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions. Volume 2.
PB 195 598 PC A10/MF A01

Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions. Annex to Volumes 1 and 2.
PB 198 035 PC A05/MF A01

PLANT REQUIREMENTS

Plant Requirements for Manufacture of Potash
Jun. '62, 11 pp. English
PB-292 672/3 PC A02/MF A01

The refinery described in the report is based on a capacity of 30 tons per day of 50 percent K20 and 120 tons per day of 60 percent K20 fertilizer. This is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. It provides a general picture of the factors that must be considered in establishing and operating a factory of this type.

Plant Requirements for Manufacture of Antibiotics
Aug. '62, 47 pp. English
PB-292 711/9 PC A03/MF A01

This report presents the establishment of a typical pharmaceutical plant, staffed and equipped to manufacture the antibiotics penicillin, streptomycin, and tetracycline.

Plant Requirements to Set Up and Operate a Leather Tannery
May '59, 45 pp. English
PB-292 803/4 PC A03/MF A01

The tannery described in this report is capable of processing 16,000 pounds of raw hides to yield 13,500 square feet of finished upper leather per eight-hour day, utilizing about 56 workers. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial, and economic factors.

Plant Requirements for Manufacture of Dehydrated Molasses
Sept. '61, 33 pp. English
PB-292 822/4 PC A03/MF A01

Basic information is presented for establishing a byproduct plant to produce dehydrated molasses from blackstrap molasses. The molasses have a high food value and can be used as a diet supplement in animal feeding. Included are brief information and cost estimates on labor, machinery, equipment, and supplies, as well as information relative to engineering, training, safety, markets, sales, financial, and economic factors. In most cases, plans for actual installations will require expert engineering and financial advice to meet specific local conditions.

Plant Requirements for Manufacture of Sheet Glass
May '59, 35 pp. English
PB-292 861/2 PC A03/MF A01

The small glass plant described in the report is considered to be the smallest size modern sheet glass plant that can be economically operated, and is designed to use the Fourcault process for production of window glass. It includes brief information and cost estimates on labor, machinery, equipment, and supplies, as well as information relative to engineering, training, safety, markets, sales, and financial and economic factors. The report provides a general picture of the factors that must be considered in establishing and operating a sheet glass factory of this size.

Plant Requirements For Manufacture of Farm Hand Tools
May '59, 51 pp. English
PB-292 860/4 PC A04/MF A01

This manual covers hand-held tools, therefore does not encompass farm implements operated by animal or mechanical energy. The primary process used in the production of farm hand tools is forging; however, because the volume of production covered by this manual does not justify costly drop-forging equipment and its accompanying expensive dies, the process of hammer forging by power hammers is proposed. In addition to power hammers, a mechanical forging press is required to obtain uniformity in the shape of certain tools and to produce shapes that would otherwise be very difficult to obtain. Other operations and equipment needed in the proposed plant are also discussed.

Plant Requirements for Manufacture of Radios
Sept. '57, 63 pp. English
PB-292 921/4 PC A04/MF A01

The small radio-manufacturing plant described is designed to produce radio receiving sets. It has several particular characteristics of special merit in connection with programs for economic development, such as: small investment of fixed capital; range of choice as to volume of operation; the rapidity with which the project may be changed; the ease of expansion; the speed with which such a product can be maintained; and the high proportion of production cost which goes to employment of local people.

Plant Requirements for Manufacture of Aluminum Architectural Specialties
Sept. '57, 15 pp. English
PB-292 956/0 PC A02/MF A01

The report presents information on total investment involved, machinery required, and manufacturing costs for establishing and operating a small plant to produce the following aluminum articles: sliding doors, various types of windows, aluminum frames for picture glass doors, showcases for stores, doors for showers, gutters, and down spouts (also in copper).

Plant Requirements for Manufacture of Flexible Steel Conduit
Feb. '57, 36 pp. English
PB-293 001/4 PC A03/MF A01

The report outlines the type of plant required for the manufacture of flexible steel conduit, flexible tubing, and exhaust hose. With the addition of some relatively inexpensive equipment, the plant can manufacture moisture-proof conduit and tube, armored cables, parkway cables, and similar armored products. In addition to steel, other metals such as aluminum, brass, and bronze may be used to make conduit, tubing, and armored cable. The report includes brief information and cost estimates on labor, machinery, equipment, and supplies, as well as information relative to engineering, training, safety, markets, sales, and financial and economic factors.

Plant Requirements for Manufacture of Surgical Instruments
Sept. '61, 13 pp. English
PB-292 665/7 PC A02/MF A01

The document discusses plant layout and plant requirements for the manufacture of the most basic surgical instruments. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific conditions.

Plant Requirements for Manufacture of Aluminum Kitchenware
Jan. '62, 33 pp. English
PB-293 011/3 PC A03/MF A01

This report presents basic information for establishing a manufacturing plant to produce aluminum kitchenware from aluminum sheets. The estimates in this report are based on the manufacture of a saucepan. Included are brief information and cost estimates on labor, machinery, equipment and supplies, and information on engineering, training, safety, markets, sales, and financial and economic factors. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

NOW AVAILABLE FROM NTIS

A Normative Model of Rural-Urban Development and Optimal Migration Policy

Text in English

Agricultural development policies directly and indirectly influence patterns of internal migration and population distribution. The reverse is also true; therefore, a nation's agricultural development policy should be consistent with its population distribution policy. Accordingly, the policy field to be investigated must include side effects and secondary consequences in these interdependent spheres. This paper is a methodological study to determine whether a computerized regional model can be constructed to improve the planning of rural-urban development, employment, and migration policy.

PB80-176217 PC E03/MF E03

Requirements Study For the 10MW Solar Thermal Pilot Plant Master Control Subsystem
June '78, 86 pp. English
SAN-1101/PA2-27 PC A05/MF A01

The requirements for the Master Control Subsystem (MCS) for a 10 megawatt solar thermal pilot plant are defined. Fundamental objectives, a basic definition of pilot plant operating modes, and a mode transition matrix are discussed. Specific MCS requirements are derived in terms of a requirements tree. A detailed plant configuration diagram containing all possible combinations of modes and control methods is included. Control constraints and subsystem control requirements are summarized, and areas in which further MCS work is needed are identified.

BUSINESS AND ECONOMICS

Prefeasibility Study of an Expanded Paint Products Industry in West Africa to 1980
July '66, 41 pp. English
PB-206 971 PC A03/MF A01

This report gives the results of a study which projected the industrialization pattern for the paint products industry in the West African sub-region through 1980. Consideration was given to the current markets for paint products, projected markets to 1980, local production of raw materials and paint products, and potential importance to the economic development of West Africa.

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Financial Control by Time Absorption Anaysis—A Tool For Profit Control
1975, 143 pp. English
PB-282 708/7 **PC A07/MF A01**

Time absorption analysis is a technique that can be used by all types of businesses for profit control. This booklet uses a step-by-step approach to introduce this concept and show the way for its adaptation to a particular business. The following topics are discussed: A step toward higher profits; uses of the new method; general principles; detailed procedure for the time-absorption method; profit or loss estimation; setting prices; financial analysis of the business; good financial control; retail-wholesale business; manufacturing; service business; and construction and contracting.

Manual of Industrial Development
June '58, 320 pp. English
PB-286 475/9 **PC A14/MF A01**

This manual examines the crucial development decisions which must be made to ensure economic progress. It primarily addresses the problem of making a rational selection of specific types of industries which would raise the productivity and living level of a developing area.

French version PB 286 476

Agribusiness and Rural Enterprise: Project Analysis Manual
Mar. '79, 219 pp. English
PB80-159213 **PC A10/MF A01**

Agribusiness and rural enterprise occupy an important intermediate position between farms and consumers, and their development can be a key factor in transforming rural development at all levels. This manual provides an overview of the role of these activities as it relates to AID project possibilities. Project analysis methods for the identification, design, monitoring, and evaluation of development assistance projects are outlined.

Petite Entreprises: 150 Questions (150 Questions for a Prospective Manufacturer)
Mar. '53, 48 pp. Text in French
PB-293 762/1 **PC A03/MF A01**

The booklet gives a prospective manufacturer the basic information necessary to start an enterprise. It covers administrative aptitude, business organization, finance, insurance, siting, equipment and construction, planning and control, sales, personnel, packaging, marketing costs and price, and general management.

Small Business in the Metals Industry: A Background Study
May '76, 88 pp. English
PB-255 649/6 **PC A05/MF A01**

This study identified planning and policy issues, marketing issues, and institutional arrangements in the metallurgical industry. It is confined primarily to the extraction and processing phases of the metals cycle. Three broad areas were identified in which small business is actively involved: high technology, service companies, and secondary recovery. Appendix A lists individuals and institutions which were contacted, while Appendix B is a selected bibliography.

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APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)
Washington, D.C. in cooperation with
National Technical Information Service (NTIS)
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This month's guest editorship comes from Allied Publishers Private Ltd., of India, a member of the NTIS technical information network.

Dear Friend,

After more than 2 years of successful operation as Managing Dealers for NTIS in India, we are only inclined to recall, though sadly, the words of the late William T. Knox (former Director of NTIS) when I met him for the first time in Madras: "India is a sleeping giant; even the surface has not been scratched as far as the potential for NTIS reports in India is concerned". Mr. Knox's prophetic words have come true after the appointment of three Managing Dealers in India.

Research reports continue to be the best selling item among NTIS products in India. Bibliographies and subscription products are yet to become popular. India is a country of teeming millions beset by enormous problems. We have, however, kept our doors open to receive useful foreign technology; hence, the necessity and usefulness for NTIS reports. In a country like India where the sun shines for a large part of the year, Solar Energy holds greater promise for the future in solving the Energy problem.

The country is committed to economic development through rapid industrialization to meet the challenges of ever increasing population. For this reason, there is a section on population growth. India is more or less self sufficient in food production, but it may not be so after a decade; therefore, to seek alternative sources of food supply, aquaculture is an area of great importance to Indian Planners. Another area of equal importance is Transportation—villages which are the backbone of our country still need to be provided with fast and convenient transportation.

S.M. Sachdev

S.M. Sachdev
Guest Editor
Allied Publishers Private, Ltd.
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SOLAR ENERGY

Technology For Solar Energy Utilization Development and Transfer of Technology Series No. 5
1978, 160 pp. **PC A08/MF A01**
PB-296 572/1 English

This report contains 17 technical papers on such topics as: conversion of solar energy into mechanical or electrical energy, the design of solar collectors, the utilization of solar energy in heating, cooling, distillation, drying and cooking, and the transfer of technology.

Engineer's Guide to Solar Energy
Feb. '79, 330 pp. **PC E13/MF A01**
PB-297 043/2 English

The Engineer's Guide to Solar Energy is designed to serve as a basic textbook, in order to enable engineers, architects, builders, or tradespeople to develop a working knowledge of solar heating technology.

Evaluation of Solar Cookers. Part I.
1962, 108 pp. English
PB-296 404/7 **PC A06/MF A01**

The report evaluates the performance and efficiency, durability, cost, shipping weight, portability, ease of operation, and manufacture of solar cookers. Of all models available for test, a Fresnel-type cooker developed by VITA showed the greatest promise due particularly to its efficiency, low cost, and ease of construction with universally available tools and materials.

High Efficiency Thin-Film GaAs Solar Cells
Apr. '79, 99 pp. English
N79-24463/8 **PC A05/MF A01**

This study investigates GaAs chemical vapor deposition (CVD) on single-crystal GaAs substrates and CVD growth on recrystallized GE films over a variety of temperature ranges.

Cost-Effective Control Systems For Solar Heating and Cooling Applications. Final Report.
Sept. '78, 180 pp. English
SAN-1592-1 **PC A09/MF A01**

This report presents the results of a study done on a variety of climate control system designs, applications, and regions. The objective of the study was to derive improved performance techniques within cost-effective control systems.

Determination of the Technical and Economic Feasibility of Luminescent Solar Concentrators. Final Report.
Mar. '79, 213 pp. English
SAND-79-7005 **PC A10/MF A01**

This report studies a new photovoltaic concentrator configuration and identifies a large number of organic and inorganic fluorescent dopant-host combinations. Absorption spectra, emission spectra, and quantum efficiencies were measured on various samples in order to identify the best candidates for a luminescent concentrator device. The major loss mechanisms responsible for decreases in collector efficiencies were identified and quantitatively evaluated.

Assessment of the Potential of Solar Thermal Small Power Systems in Small Utilities
Nov. '78, 222 pp. English
N79-16377/0 **PC A10/MF A01**

The potential economic benefit of small solar thermal electric power systems to small municipal and rural electric utilities is assessed. Five different solar thermal small power system configurations were considered in three different solar thermal technologies. The results are summarized in terms of break-even capital costs.

Investigation of Low-Cost Solar Cells Based on CU20
Sept. '78, 86 pp. English
PB-290 940/6 **PC A05/MF A01**

Research conducted over a 3 year period to investigate solar cells based on cuprous oxide is summarized. This report discusses an approach which was developed for doping cuprous oxide with magnesium and chlorine to achieve material with a resistivity in the 1 to 10 ohm-centimeter range.

Solar Ponds (Citations From the NTIS Data Base)
Aug. '78, 34 pp. English
NTIS/PS-78/0836/3 **PC NO1/MF NO1**

Federally-funded research on the design, performance, and use of solar ponds is discussed in this published search. Topic areas cover: the use of solar ponds in industrial process heat production; roof ponds for passive solar buildings; and solar pond use in the production of biomass for renewable fuels.

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DOE Facilities Solar Design Handbook
Jan. '78, 177 pp. English
DOE/AD-0006/1 **PC A09/MF A01**

This handbook covers design of solar heating systems for commercial and laboratory buildings and discusses solar energy fundamentals, solar heating and cooling technology, systems, and components, and solar system economics. Quantitative analysis, with generalized design and sizing curves, is presented for solar heating so that collector and other system parameters can be cost-economically sized without a computer simulation. Solar system design considerations and guidelines, as well as guidelines for developing subsystem specifications are presented.

Solar Technology Applications: A Survey of Solar Powered Irrigation Systems
Apr. '78, 46 pp. English
UCID-17510 (Rev. 1) **PC A03/MF A01**

Published information on solar powered irrigation systems, thermal solar systems, thermoelectric solar systems, and photovoltaic solar systems are presented. A bibliography and survey of on-going work are included.

Solar Energy, Water, and Industrial Systems in Arid Lands: Technoecological Overview and Annotated Bibliography
1978, 165 pp. English
PB-285 129/3 **PC A08/MF A01**

This bibliography offers a small but typical selection from the solar energy literature. Major focus is on introductory and review publications, and specialized works dealing with arid lands and water.

Solar Heating and Cooling Systems Design and Development
July '77, 88 pp. English
N78-31532/2 **PC A05/MF A01**

The development of 12 prototype solar heating/cooling systems, 6 heating and 6 heating and cooling systems, for single family, multi-family, and commercial applications are reported. Schedules, technical discussions, and illustrations are provided.

High Performance GaAs Photovoltaic Cells for Concentrator Applications. Final Report, October 13, 1976—October 13, 1977
Dec. '77 87 pp. English
SAND-78-7018 **PC A05/MF A01**

This report describes work being done on the AlGaAs/GaAs concentrator cell to make it ready for pilot-line production.

Utilization of Solar Energy in Developing Countries: Identifying Some Potential Markets
1978. 13 pp. English
DOE/NASA/1022-78/41 **PC A02/MF A01**

The potential use of solar electricity generated from photovoltaic cells for 19 developing nations is examined. Energy and economic profiles are summarized for each country, and a comparison is made between the use of autogeneration and photovoltaics in a rural area of Haiti.

Novel Solar Collector Using a Large Circular Fresnel Lens Concentrator. Final Report.
May '78, 89 pp. English
SAND-78-7023 **PC A05/MF A01**

The results of a preliminary design and commercial cost projections study for a large circular fresnel lens solar collector are provided in this report. Lens development is a separate activity, not covered by this study. The purpose of the study was the determination of the value of such a collector from the performance and cost standpoint.

Wind and Solar Energy Applications Study
Aug. '77, 113 pp. English
PB-287 593/8 **PC A06/MF A01**

The study on solar radiation and wind power applications is a facet of the total solar assessment program. The result of this report is a broad implementation plan highlighting seven typical applications—three solar, three wind, and one combination.

Passive Solar Heating and Cooling
1976, 364 pp. English
LA-6637-C **PC A16**

This report is a compilation of 45 papers-each having a separate abstract.

Photovoltaic Power Systems for Rural Areas of Developing Countries
1979, 19 pp. English
N79-15411/8 **PC A02/MF A01**

Systems technology, reliability, and present and projected costs of photovoltaic systems are discussed. Operating systems in two villages, one in Upper Volta and the other in southwestern Arizona are described. Energy cost comparisons are presented for photovoltaic systems versus alternative energy sources. Based on present system technology, reliability, and costs, photovoltaics provide a realistic energy option for developing nations.

Public Utility and Solar Energy Interface: An Assessment of Policy Options. Final Report.
DSE/2523-2 English
Dec. '76, 206 pp. **PC A10/MF A01**

Previous research studies have for the most part failed to consider the interaction of solar energy heating/cooling/hot water systems with the provision of auxiliary systems. This study reviews, assesses, and critiques existing research and on-going activity in the interface between the public utility industry and solar energy systems. This study also suggests and determines the potential impact of policy operations in the interface.

Low-Cost Solar Collector of a Packed Bed Design
July '77, 20 pp. English
COO/2972-1 **PC A02/MF A01**

Two solar collectors using a pebble bed design were constructed and tested using air as the heat exchange media. The advantages of the pebble bed lie in the availability of the bed material, its thermal and radiation stability, and its shielding of underlying collector materials from ultraviolet radiation. Several pebble bed collectors using water as the heat exchange media were constructed; however, it was concluded that pebble bed collectors using water are impractical.

Public Utility and Solar Energy Interface: An Assessment of Policy Options. Executive Summary. Final Report.
Dec. '76, 72 pp. English
DSE/2523-1 **PC A04/MF A01**

Existing research and on-going activity in the interface between the public utility industry and solar energy systems for buildings are reviewed and assessed. The state-of-the-art is presented as both an exhaustive comparison of studies to date concerning methods of evaluating the performance of solar buildings in the interface, and present state legislation in solar demonstration and research projects. The results of initial surveys of utility manager perceptions and consumer attitudes are presented, and a discussion of various public policies affecting the interface and their impact is given.

Guide to Demonstrations of Energy Conservation. Solar Energy and Other New Technologies: Energy Extension Service
Sept. '77, 307 pp. English
TID-28044 **PC A14/MF A01**

This guide is intended to facilitate viewing of solar, conservation, and other energy technologies at work. The demonstrations listed have generally been limited to those most applicable to individual homowners, small businesses, schools, and farms. In addition to solar heating and cooling for homes and commercial buildings, a number of examples of farm applications such as solar crop drying are listed, as well as demonstrations of wind energy, biomass, and photovoltaics.

The Performance and Economic Feasibility of Solar Grain Drying Systems
Feb. '78, 39 pp. English
PB-280 196/7 **PC A03/MF A01**

The performance and costs of eight experimental on-farm solar collectors designed to dry corn were studied, and the drying costs were compared with the costs of owning and operating conventional grain dryers. The eight solar grain drying systems include: Rock heat-storage, flat-plate, inflated tube, suspended plate, wraparound, intensifier, air-supported, and multiuse.

Residential Hot-Water Solar Energy Storage Subsystems
Jan. '76, 117 pp. English
PB-252 685/3 **PC A06/MF A01**

Low-cost, efficient, and practical hot-water solar energy storage subsystems for heating and cooling of residences are discussed in this report. Both new and innovative vessel materials and configurations are investigated together with insulation materials. Performance requirements for residential hot-water storage systems are examined, and matrix of advantages and disadvantages constructed, taking into consideration vessel material, configuration, location, and type of residential construction. Other matters considered are corrosion control, costs, and development requirements.

Flat-Plate Solar Collector Handbook: A Survey of Principles, Technical Data, and Evaluation Results
Mar. '76, 96 pp. English
UCID-17086 **PC A05/MF A01**

This report discusses flat-plate solar collector principles, and evaluates data for 13 manufacturers of medium temperature collectors that have met the following criteria: intention by the manufacturer that the equipment be used only for heating and cooling buildings and for domestic hot-water heating; and evaluation of the collector by NASA using a solar simulator as a basis for collector selection and performance prediction.

An Inexpensive Economical Solar Heating System for Homes
July '76, 59 pp. English
N76-27671/6 **PC A04/MF A01**

This report describes a low-cost solar home heating system to supplement existing warm-air heating systems. Instructions are given for a solar heating installation in which the homeowner supplies all labor necessary to install off-the-shelf components. Manufacturers and prices of each component used and a rough cost analysis based on these prices are included. Also given is performance data obtained from a demonstration system which was built and tested at the Langley Research Center.

Solar Energy Applications in Agriculture: Potential, Research Needs, and Adoption Strategies
Jan. '76, 119 pp. English
PB-295 105/7 **PC A06/MF A01**

This study's objectives are: assessment of present agricultural operations to determine those with potential for use with solar energy; development of recommendations for an overall experimental research program to establish the technical and economic

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EFFECT OF SIMPLE ROAD IMPROVEMENT MEASURES ON VEHICLE OPERATING COSTS IN THE EASTERN CARIBBEAN

This report describes the effect on vehicle operating costs of a simple labor-intensive method of rehabilitating and maintaining badly deteriorated bitumen-surfaced roads in the Eastern Caribbean. The techniques developed for the rehabilitation and maintenance of the roads are described, and the equipment, materials, and manpower required are listed.

Text in English PC A03/MF A01
PB80-162381

feasibility of using solar energy in agricultural operations; and formulation of recommendations for strategies to achieve adoption of solar energy components and systems in agriculture. Applications of solar energy to the following aspects of agriculture are examined: grain drying, tobacco curing, peanut drying, broiler housing, swine production, farm housing, greenhouses, and irrigation. Current fuel prices for each of the agricultural regions (determined by crop production) are also reviewed.

Solar Air—Conditioning Study
Apr. '77, 149 pp. English
AD-A043 951/3 **PC A07/MF A01**

The state of the art of solar cooling is evaluated to determine the near term performance potentials and life-cycle costs of the most promising approaches. The heat actuated absorption cycle, ranking cycle, and desiccant dehumidification cycle are examined. The operation principles are described, performance coefficients are reviewed, operating constraints are examined, and the commercial status of each approach is evaluated.

Solar Program Assessment: Environmental Factors. Solar Agricultural and Industrial Process Heat
Mar. '77, 56 pp. English
ERDA-77-47/2 **PC A04/MF A01**

The major environmental issues associated with the development of solar energy as a source of process heat in the industrial and agricultural sectors are presented and ranked according to priority. To provide a background for this environmental analysis, the basic concepts and technologies of solar process heating are reviewed. Finally, an environmental work plan is presented which lists research and development proposals aimed at alleviating specific environmental and safety problems.

POPULATION GROWTH

Economic Incentives: A Strategy For Family Planning Programs
Oct. '72, 82 pp. English
HRP-0009215/5 **PC A05/MF A01**

A framework is presented within which the effects of incentives on fertility behavior and on utilization of family planning services can be systematically examined. The possible need for and role of incentives throughout the evolution of a family planning program are examined, and major incentive programs operating in low-income nations as of October 1972 are described. A bibliography is provided.

Practical Suggestions For Family Planning Education
1975, 101 pp. English
HRP-0009927/5 **PC A04/MF A01**

Educational activities within a family planning program are discussed, and techniques for developing a family planning education program are suggested in this report. Techniques include problem identification and analysis, resource identification and use, and educational plan development. The goals and objectives of an educational plan are noted, a checklist is provided for evaluating a family planning education program and a model is described for the development of contraceptive educational materials. A bibliography of family planning materials is provided.

Methods For Measuring Population Change. A Systems Analysis Summary
Mar. '69, 26 pp. English
PB-297 111/7 **PC A03/MF A01**

This report is an introductory study of varying requirements of data for the measurement of population change, and of the alternative methods which are available to obtain these data. Data requirements are grouped into four categories, and seven major statistical methods are explored and rated in terms of their usefulness in furnishing each type of data.

Demographic Techniques For Manpower Planning in Developing Countries
1968, 262 pp. English
PB-287 262/0 **PC A12/MF A01**

The handbook was prepared to meet the need for simplified techniques for estimating the labor forces and that part of the population which might be affected by manpower development programs. The areas discussed include: estimating and projecting total population, estimating and projecting components of population change and the labor force. Include in the handbook is a section of worksheets for practical application of the areas discussed.

In Search of Population Policy. Views From the Developing World.
Aug. '74, 120 pp. English
PB-241 579/2 **MF A01**

The volume reports the results from five regional seminars held in South Asia, the Middle East, Latin America, Africa, and Southeast Asia, and provides information on policy aspects of population issues viewed at the national, community, family, and individual levels. Among the issues discussed are effects of migration and population distribution, reductions of mortality and morbidity, improvement of health care, effects of urbanization, employment, the role of education, and effects of foreign assistance. (Available in microfiche only).

AQUACULTURE

Chinese Fish Culture. Pond Culture and Fish Rearing
1979, 25 pp. English
AD-A069 182/4 **PC A02/MF A01**

The development of pond fish culture in China involves the utilization of small water bodies such as dams or natural ponds for rearing fish. Pond fish culture provides fish fingerlings and food fish to the freshwater fishing industry. In order to meet the demands of the fishing industry, high-density rearing, mixed-species rearing, large-scale feeding, and frequent harvesting are required. This report discusses Chinese pond culture and fish rearing practices.

Aquaculture. Part 1. Fish. Volume 2. 1975-April 1979 (A Bibliography With Abstracts)
May '79, 264 pp. English
NTIS/PS-79/0468/3 PC NO1/MF NO1

Studies on growth, breeding, nutrition, economics, and management methods are presented in this published search. The principal fishes discussed are bass, catfish, carp, herring, menhaden, minnow, and trout. Rearing in warmwater silos, harvesting, fish diseases, and statistical data of the fishery industry are included.

Aquaculture. Part 2. Shellfish. Volume 2. 1977-April, 1979 (A Bibliography With Abstracts)
May '79, 112 pp. English
NTIS/PS-79/0469/1 PC NO1/MF NO1

Data on clams, crayfish, crustacea, lobsters, mollusca, oysters, and shrimps are included in this published search. Restoration of shellfish beds, hybridization, selection, nutritional requirements, and related studies are covered. Requirements for the reproduction, growth, feeding, and habitat are cited.

Bivalve Mollusc Culture in a Waste Recycling Aquaculture System
Sept. '77, 119 pp. English
PB-275 180/8 PC A06/MF A01

During the Sea Grant fiscal year 1976-77, research continued on the development of a waste recycling aquaculture system. This study monitored the predominance of phytoplankton species in mass algal cultures to further understand the waste recycling aquaculture system. Work has centered on the effect of physical parameters on optimizing shellfish growth.

An Alternative Prawn Production Systems Design in Hawaii
May '77, 38 pp. English
PB-275 345/7 PC A03/MF A01

Freshwater prawn farming is a new and dynamic growth industry in Hawaii. Considerable progress has been made in hatching and rearing techniques of freshwater prawn farming; however, there is still considerable room for improvement, especially for the growout system. This report breaks down and examines the current 'Anuenue' strategy through use of engineering economy methods. Areas with short-term potential for improvement are identified and an alternative is recommended.

The Technology and Economics of Small-Scale Commercial Prawn ('Macrobrachium Rosenbergii) Hatcheries: A Case Study in Thailand
May '75, 22 pp. English
PB-263 669/4 PC A02/MF A01

The objective of this paper is to describe and comment on the practical operation and economic experience of small-scale private commercial, and family operated prawn hatcheries, so as to give those interested in the industry practical insights into the requirements, potentials, and problems of hatchery operation. The paper which is in the form of a case study, includes a commentary and suggestions for improvement of hatchery operation.

Pond Culture of the Malaysian Prawn, 'Macrobrachium Rosenbergii' (De Man), in South Carolina, 1974-1975
1976, 26 pp. English
PB-264 738/6 PC A03

The feasibility of growing Macrobrachium rosenbergii commercially in ponds is under investigation in South Carolina. This report contains results of 1974 and 1975 pond studies which indicate a favorable outlook for eventual commercial production.

Syllabus of Fish Health Management: I. Fish Culture Methods. II. Fish Disease Diagnosis
Dec. '73, 235 pp. English
COM-74-10692/3 PC A11/MF A01

The syllabus of fish health management consists of two sections. The first discusses fish culture methods and the second provides information on fish disease diagnosis.

TRANSPORTATION

International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India, on November 20-30, 1978. Appropriate Rural Transportation Facilities in Developing Countries
Oct. '78, 16 pp. English
PB-297 663/7 PC A02/MF A01

The document addresses the need for the design and manufacture of alternative and appropriate modes of motorized and non-motorized transport, specifically to meet rural requirements. The technological alternatives considered are human portage; handcarts, wheel barrows etc.; muscle-powered and pedal-driven vehicles; animal-powered transport; motorized rural transport; and boats and outboard engines. A program of action is offered for the development of alternatives.

The Manufacture of Low-Cost Vehicles in Developing Countries
1978, 40 pp. English
PB-296 571/3 PC A03/MF A01

This study promotes the manufacture and use of low-cost vehicles in developing countries. It is designed to assist government officials responsible for formulating policies on modes of transportation in their countries, and business people concerned with the manufacture of various types of transport vehicles. It describes the main types of low-cost vehicles, what is involved in launching their manufacture, and aspects of marketing them. It reviews recent developments in several Asian countries where low-cost vehicles have significantly penetrated the market. A list of manufacturers is included.

RICE-GROWING TECHNOLOGY

ANATOMY OF A PEASANT ECONOMY: A RICE VILLAGE IN THE PHILIPPINES

The influences of improved rice-growing technology in effecting economic and social changes in rural Philippine villages is assessed. The report analizes the impact of new rice technology on various facets of life, such as employment and income distribution, and monitors the flow of income from rice farming and other enterprises among classes of village households. Photographic illustrations, tables, and a liberal list of reference works are included.

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1977, 23 pp. English
PB-280 521/6 PC A02/MF A01

The report presents a survey of intermediate forms of urban public transport used throughout the developing world. The controversy surrounding intermediate public transport is discussed and the more important issues and problems are identified The purpose of the report is to explain the significant role that intermediate public transport performs in the urban sector of developing countries.

Alternative Fuels For Automotive Transportation. A Feasibility Study. Volume II. Technical Section
July '74, 280 pp. English
PB-276 792/9 PC A13/MF A01

Contents: fuel selection methodology; U.S. domestic resource base; energy demand and supply models; fuel synthesis technology; fuel properties and compatibility; environmental effects and resource depletion; alternative fuel system economics; technology and information gaps; selection of candidate alternative fuels; conclusion and scenarios.

Alternative Fuels For Automotive Transportation. A Feasibility Study. Volume III. Appendices
July '74, 115 pp. English
PB-276 793/7 PC A06/MF A01

Contents: Appendix A: properties of potential alternative fuels for automotive transportation—(Data sheets for 18 candidate fuels and bibliography). Appendix B: detailed process descriptions and economics for candidate fuels from coal and oil shale —(Gasoline and distillate fuels from coal, gasoline and distillate fuels from oil shale, methanol from coal, and SNG from coal).

Choice of Transport Technology Under Varying Factor Endowments in Less Developed Countries
June '70, 409 pp. English
PB-195 291 PC A18/MF A01

The study was performed to assist developing countries in making economically rational choices in transport technologies. The study uses cost simulation models for road, rail, and air transport modes to develop guidelines for planners, taking into account the availability of labor and capital in the developing countries.

World Survey of Current Research and Development on Roads and Road Transport (1978). A Report Covering an Inventory of 59 Countries
Dec. '78, 574 pp. English
PB-290 509/9 PC A24/MF A01

This is the 13th in a series of annual reports on inventories of research and development projects conducted by governmental, academic, and commercial research organizations in 59 countries. It is the only publication that reports worldwide information on current research activities in the highway field. The report lists 5,609 projects, classified in accordance with the subject area classification system of the Transportation Research Board.

Design and Traffic Control Guidelines For Low-Volume Rural Roads
Oct. '79, 50 pp. English
PB80-142052 PC A03/MF A01

The research evaluates the safety needs on low-volume rural roads. Based on a series of functional analyses relating safety performance to specific design and operational elements, a set of revised guidelines was developed. The wide-spread application of the revised guidelines should provide a consistent design and traffic control of low-volume rural roads together with a rational balance between highway investment, highway safety, and traffic service.

Engineering Study of Laterite and Lateritic Soils in Connection With Construction of Roads, Highways, and Airfields. Phase I. Southeast Asia (Thailand)
June '69, 382 pp. English
PB-207 399 PC A17/MF A01

This document provides the results of field studies carried out in Thailand on lateritic soils. Included are reports on background studies of the development of a classification system for the soils pavement evaluation studies, and special studies on durability, stabilization, and dynamic properties.

Transportation Technology For Development. Volume I
Feb. '68, 488 pp. English
PB-210 592 PC A21/MF A01

This report provides background information on the technology and capabilities of various transportation modes. Information is included on such areas as: the broad capacities of modes to handle freight and passenger traffic; levels of technological sophistication that can be adopted within each mode; intermodal factors of choice in highway, railway, air, inland waterway, oceanway, and pipeline transportation; as well as intermodal freight exchange.

Transportation Technology For Development. Volume II
Feb. '68, 265 pp. English
PB-210 593 PC A12/MF A01

The second volume of the transportation technology for development study contains sections on; aerial tramway; beltway; monorail; air-cushion vehicle; and hydrofoil transportation systems. Also discussed in the study are: new power sources and their effect on transportation technology; and external technological factors and their influence on transportation needs.

TIMELY INFORMATION ON DREDGING PRACTICES

Assessment of Certain European Dredging Practices and Dredged Material Containment and Reclamation Methods

1978, 242 pp.
AD-A074 219/7 Text in English
PC A11/MF A01

A study was made of dredging practices, reclamation methods, and environmental effects of dredging by visiting more than twenty ports in six countries, and discussing pertinent matters with knowledgable authorities at each port. A remarkable similarity of dredging practices, reclamation methods, and dredging equipment was noted among the ports studied. The need for regional and world-wide legislation to control contamination and other adverse environmental effects was also recognized. The report discusses technical details of describing, increasing the density of, disposing, and making productive use of dredged materials. Conventional and special dredging equipment is described and contamination of dredged material and environmental effects is discussed.

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AMTID

APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
(USAID)
Washington, D.C. in cooperation with
National Technical Information Service (NTIS)
an agency of the U.S. Department of Commerce

AMTID 80-9 **September 1980**

RURAL DEVELOPMENT

Small-Scale Power Supplies For Rural Communities in Developing Countries
Mar. '63, 120 pp. English
PB-206 800 **PC A06/MF A01**

The report describes and evaluates alternative small-scale technologies for supplying electric energy to rural communities in developing countries. It evaluates the technical suitability of currently available small-scale power supplies, and describes near-term and far-term development opportunities for improved equipment systems. Samples of technologies considered are: internal combustion engine generators; small scale hydroelectric plants; thermal vapor engine generators; gas turbine generators; wind generators; photovoltaic solar cells; thermoelectric generators; and fuel cells.

Generation and Utilization of Power For Rural Communities in Developing Countries
May '63, 39 pp. English
PB-206 801 **PC A03/MF A01**

The principal objectives of the project were to assess the need for and significance of electric power for the development of rural communities with particular attention to the utility and feasibility of small scale power supplies as a means of providing power to village communities. The specific areas of concern included: small- and intermediate-scale generating plants and grid connections for rural communities; utilization of electric power in rural communities for irrigation, rural industry, and illumination; technical appraisal of potential small-scale power sources, refrigeration-cooling systems, water treatment processes; and technical support for rural development.

Local Organization For Rural Development: Analysis of Asian Experience
Nov. '74, 174 pp. English
PB-294 146/6 **PC A08/MF A01**

The report analyzes and summarizes the findings of a study of the role of rural local institutions in the rural development process. The study emphasizes agricultural productivity, income, local participation, and rural welfare. The development process in several Asian countries is examined.

Dear Friend, 9231#

I would like to thank all of you for your support of the USAID/NTIS Technical Information Network and to let you know how much I have enjoyed being part of this network. My husband, former AMTID editor, Paul Tuebner, and I will be leaving for Gaborone, Botswana, in November, and we are looking forward to exciting work ahead!

At this time, I would like to announce that Innovacion-Informacion-Tecnologia (INFOTEC) in Mexico City, Mexico will begin producing AMTID very shortly. We are all very happy about this new development, and are certain that the newsletter will continue being an effective tool in facilitating access to information for developmental needs.

Because of already encountered delays and the upcoming change, there is a possibility that you will begin receiving issues out of sequence. However, whenever the information arrives, we hope that you will still find it useful.

This issue of AMTID features publications on rural development. The publications listed cover information on health care, housing, building and construction, electrification, and rural development technologies, to name but a few.

Sincerely,

Annette Tuebner

Annette Tuebner
Editor

Regional Development: A Review of the State-of-the-Art
Aug. '74, 80 pp. English
PB-294 131/8 **PC A05/MF A01**

This report discusses the problems less-developed nations face in their development and growth, and suggests development strategies. An overview of regional development planning experiences in developed and developing countries is also included.

Rural Portable Water Chlorination
1970, 41 pp. English
PB-282 460/5 **PC A03/MF A01**

The paper addresses two questions: What is the most desirable form of sanitizing chemical for use in rural water supplies; and What is the best overall means of getting this sanitizing agent into rural water supplies. Several chemicals and hypochlorinators are described and evaluated. A low-cost, dependable feeding device suitable for use in disinfecting marginal waters in the rural areas of developing countries is presented. This device can be operated and maintained by unskilled labor; there is no need for a sophisticated power source to provide continuous, automatic operation; and the device uses a readily available commercial chlorine chemical that can be economically shipped and stored. An appendix giving technical specifications and performance data is included.

Towards Rural Futures: An Approach Through the Planning of Technologies
June '78, 24 pp. English
PB-294 549/1 **PC A02/MF A01**

The report discusses the potential of technological research and development for creating rural futures in third world countries, especially in South Asia and Africa, and outlines criteria and a method of planning for identifying new technology.

Introduccion Al D.C. Para Los Trabajadores De Las Aldeas (An Introduction to Community Development For the Village Workers)
Apr. '62, 38 pp. Text in Spanish
PB-297 632/2 PC A03/MF A01

This booklet gives insights into aims, basic principles, and elementary procedures in community development, on which workshop procedures would be based. It offers a common-sense approach to local village development procedures.

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Rural Enterprises: An Overview of the Role and Potential of Rural Enterprises to Contribute to the Employment and Income of the Rural Poor
Apr. '77, 19 pp. English
PB-285 984/1 PC A02/MF A01

As agricultural output increases, new opportunities develop for providing goods, services, and markets in rural areas. Farmers require additional farm inputs and need processing and marketing facilities for outputs. In addition, rising rural incomes create new demand for consumer products. The paper discusses how rural enterprises can contribute to the overall economy and what mechanisms have been used in attempts to stimulate their development.

Programa De Tecnologia Rural Intermedia (Intermediate Rural Technology Program Information Bulletin)
July '78, 15 pp. Text in Spanish
PB-297 859/1 PC A02/MF A01

Description of four different "intermediate" technology projects developed by INTEC are presented: grape drying using a solar system of natural heat transfer; a bio-fuel generator, using animal excrement and vegetable refuse as sources of methane; homemade solar dehydrator for agricultural products; construction of a sand filter for water purification in rural zones. Construction diagrams are provided for each given technology. The addresses of international organizations with compiled bibliographies of intermediate technology are included.

Energy For Rural Development: Renewable Resources and Alternative Technologies For Developing Countries
1976, 306 pp. English
PB-260 606/9 PC A14/MF A01

This report summarizes the state-of-the-art of alternative technologies frequently suggested as solutions to rural or individual family energy needs. Also given is an information source list.

Profile Change When Industry Moves Into a Rural Area
Feb. '73, 15 pp. English
Com-74-10547/9 PC A02/MF A01

The paper examines the economic and social changes which take place in a rural community when industry is introduced. The report suggests that the most profound impact is on land use and support systems. Additional changes occur in the size and composition of the labor force, retail sales and services, housing development, and the demand for schools and other publicly provided services.

Rural Industrial Technical Assistance (RITA)
July '71, 129 pp. English
PB-207 626 PC A07/MF A01

Project Rita (Rural Industrial Technical Assistance), Rio Grande Do Norte, Brazil, was a program designed to provide assistance in industrial development to selected areas in the interior of the State of Rio Grande Do Norte. The project team consisted of professors and graduate students from the Federal University of Rio Grande Do Norte and from Utah State University. Their efforts in the study, selection, planning, organization, and establishment of small- and medium-sized businesses in the project area are reported in this document.

Problems and Challenges Faced by Rural Communities With Industrial Development
1972, 25 pp. English
Com-74-10543/8 PC A02/MF A01

The paper reviews problem areas which may arise in a rural community during and after industrialization. The report discusses such factors as the social and economic effects of the labor force employed by the industry, changes in the use of land and local facilities, and potential increases in the cost of living.

Communication in India. Experiments in Introducing Change
May '68, 64 pp. English
PB-210 508 **PC A04/MF A01**

An often-encountered difficulty in development programs involves gaining popular acceptance of beneficial changes. This document reports the results of a communication experiment involving the adoption of modern agricultural, health, and family planning practices by the inhabitants of a number of villages near Lucknow, Uttar Pradesh, India. The study evaluated the effects of two communication treatments: radio farm forums, and literacy training classes. It was found that while knowledge of practices spreads quickly, adoption is slow and at low levels.

Industrializing at the Grass Roots Level in the Philippines
1963, 63 pp. English
PB-206 902 **PC A04/MF A01**

It has been found that the establishment of a first industry in an underdeveloped region stimulates others into being. This principle has been demonstrated in the Philippines as well as in other developing countries. In addition to a general discussion of principles and procedures, this document contains a detailed report of a survey made of a single Philippine province to obtain practical information concerning its resources, natural advantages, and the desires of its people regarding industrialization.

Village Technology Handbook
May '70, 382 pp. English
PB-207 491 **PC A17/MF A01**

The purpose of this handbook is to help villagers master the resources available to them. The general topics covered include water transport; storage, and purification; latrines; bilharziasis control; irrigation and road-building; poultry raising; silage; storing food at home; storing vegetables and fruit for winter use; how to salt fish; concrete construction; bamboo construction; glues; solar water heating; washing machines; cookers and stoves; soap making, and bedding.

Development and Change in a Bengal Village
May '68, 266 pp. English
PB-210 332 **PC A12/MF A01**

The report studied the process of planned change in a village of West Bengal, India. It describes reactions of farmers to specific agricultural programs, with special emphasis on determining the causes of rejection of an improved agricultural practice. The communication process of conveying modern ideas and practices to the villagers was also examined. The report describes the physical setting of the village, community structure, development and change, and adoption of innovations.

HOUSING

Village Housing in Tropics, With Special Reference to West Africa
June '69, 72 pp. English
PB-188 926 **PC A04/MF A01**

This report investigates the optimum location of villages, types of village layouts, housing design, and community facilities.

Rural Housing Manual
Mar. '71, 378 pp. English
PB-207 507 **PC A17/MF A01**

The key to success in a rural housing program lies in the ability and desire of the local leadership to atttain good low-cost housing. This training manual, along with technical assistance, is designed to keep rural electric cooperatives.

Special Report On Techniques of Aided Self-Help Housing. Some Examples of United States and Overseas Experience
Nov. '73, 29 pp. English
PB-236 285/3 **PC A03/MF A01**

Organized, aided, self-help housing programs are a way for many families to obtain decent housing through their own efforts at a relatively small capital expenditure. The report describes selected experiences in Puerto Rico, Trinidad/Tobago, Guatemala, Tanzania, and selected U.S. areas.

FPL (Forest Products Laboratory) Designs Meet Family Housing Needs
1972, 30 pp. English
AD-744 691 **PC A03/MF A01**

The Forest Products Laboratory (FPL) has developed five low-cost rural house plans to demonstrate cost-saving construction principles. The plans feature simplicity of design, but provide structurally sound houses that fulfill the needs of many families. A survey was made and results show that structurally sound houses can be built to meet the needs of low-income families, and at affordable prices.

A Housing Services Policy For Low-Income Urban Families in Underdeveloped Countries
Dec. '74, 26 pp. English
AD-A010 976/9 **PC A03/MF A01**

Housing policies for urban low-income families in underdeveloped countries have emphasized the necessity of fully serviced standard housing units. These policies are very often unsuccessful. This paper discusses the financial component of a housing services policy which promises to be effective for these families.

Housing the Campesino. A Case Study of Cooperative Housing in Rural Panama
1966, 28 pp. English
PB-188 852 **PC A03/MF A01**

The report describes a case study of cooperative housing in Los Pocitos, Panama. It describes the organization and administration of the housing program, the design and financing of typical houses in the project, and its applicability in other locations.

Aided Self-Help in Housing Improvement. Ideas and Methods Exchange
Aug. '69, 64 pp. English
PB-188 931 **PC A04/MF A01**

The document discusses fundamental principles of self-help housing and how to organize self-help projects and secure technical and financial assistance. It describes programs in Burma, Jamaica, Puerto Rico, Greece, Taiwan, and Sweden.

An Analysis of Alternative Low-Income Rural Housing Systems
June '73, 137 pp. English
PB-229 209/2 **PC A07/MF A01**

The study examines several different housing authorities with regard to their public housing alternatives. The problems of small housing authorities are outlined. The report includes a design of a model agency and makes administrative and legislative recommendations.

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Urban Development, Including Housing
Apr. '70, 25 pp. English
PB-191 034 PC A02/MF A01

An annotated bibliography is given. It consists mainly of United States Agency for International Development publications in the field of urban development, with special emphasis on housing.

BUILDING AND CONSTRUCTION

A Study of the Feasibility of Utilizing Solid Wastes For Building Materials. Phase I: Summary Report
Apr. '78, 164 pp. English
PB-279 440/2 PC A08/MF A01

This document reports on a study to research and develop building materials containing organic and inorganic wastes and waste-derived products. Two types of matrices, furfural-phenolic and inorganic, were selected for further study. Seven reinforcement candidates and five filler candidates were selected for evaluation with the two matrices.

Factors Affecting the Durability of Adobe Structures
July '78, 42 pp. English
PB-286 096/3 PC A03/MF A01

Adobe samples were analyzed to determine mineral assemblages, particle size distributions, soluble salt contents, and porosities. These analyses were accompanied by microscopic observations of polished sections and thin sections, and data were correlated with observations made on the weathering properties of adobe. Conclusions and recommendations were made from information gathered by the observations.

--PUBLISHED SEARCH--

ARCHITECTURAL CONSTRUCTION
MATERIALS:
CONCRETES AND CEMENTS.
JUNE 1976-APRIL 1980
(Citations from the NTIS Data Base)

Concrete/cement construction materials for architectural applications are investigated in these research reports. Structural design and performance are reviewed; however, studies for bridges, pavements, airfields, and cold weather construction are excluded. This updated bibliography contains 310 abstracts.

PB80-810757 PC N01/MF N01

Self-Help Construction of 1-Story Buildings
1977, 244 pp. English
PB-291 857/1 PC A11/MF A01

This manual is designed to assist a community to: plan and design a one-story building for present and future needs, assess the advantages and disadvantages of locally available construction materials, draw and understand construction plans, and successfully complete construction according to the construction plans. The manual focuses on basic principles of construction with materials that are low-cost, available in many parts of the world, and easy to work with. Illustrations are included.

Development of Low-Cost Roofing From Indigenous Materials in Developing Nations
Dec. '75, 349 pp. English
PB-249 317/9 PC A15/MF A01

This report covers Phase II of a 3½-year research effort to match indigenous fibers and fillers with low-cost binders to produce improved roofing for developing countries. Phase II emphasized roofing materials development and establishing the mechanism for the transfer of the technology.

Maisons En Terre (Earth For Homes) Ideas and Methods Exchange No. 22
May '69, 85 pp. French
PB-286 423/9 PC A05/MF A01

This is a nontechnical paper for those who wish to become informed on the uses of earth. Soils, methods of earth wall construction, earth floors, earth roofs, wall finishes, and the design of earth homes are discussed.

Lime and Alternative Cements: Proceedings of a One-Day Meeting on Small-Scale Manufacture of Cementitious Materials
1974, 174 pp. English
PB-297 680/1 PC A08/MF A01

The report contains papers describing alternative cements used for construction materials, manufacturing processes involved in their production, and the applications for using the end products.

Development of Low-Cost Roofing From Indigenous Materials in Developing Nations
July '74, 274 pp. English
PB-239 493/0 PC A12/MF A01

The report covers the first year of a research effort to use indigenous fibers and fillers with low-cost binders to produce improved roofing for developing countries. The ultimate goal of the development program was to make available a roofing system which is an economically and technically acceptable alternative to the extensively used corrugated galvanized iron, a material which has high foreign exchange costs, insufficient use of indigenous materials and manpower, and poor thermal insulation and durability. Phase I goals are summarized, and a work plan for Phase II is given.

Development of Low-Cost Roofing From Indigenous Materials in Developing Nations, Final Report. 18 May 73-31 December 77
Feb. '78, 434 pp. English
PB-294 423/9 PC A19/MF A01

This document covers a 4-year research program to develop low-cost roofing from indigenous materials in three developing nations (Philippines, Jamaica, and Ghana). In Phase I, resources were surveyed, and collaborating individuals and organizations defined; In Phase II, experimental roofing composite materials systems were developed; In Phase III, demonstrations of the roofing manufacture were conducted and experimental roofs installed. The program was implemented in the three participating countries through advisory committees and technical working groups. Local labor, materials, and facilities were used to demonstrate manufacture of roofing by one or more of the processes.

Design Properties, Structural Analysis and Construction Details For a Typical U-Form Wall System
1978, 28 pp. English
PB-295 654/8 PC A03/MF A01

The U-Form wall system is applicable not only to sophisticated high-rise buildings, but also to low-cost, low-rise buildings. Two 12-story apartment buildings of 116 units each were recently erected at the rate of 2 floors per week, using only one 6-person crew. U-Forms can be fabricated and erected with unskilled labor, using a variety of local materials, in low capital-investment situations. For this reason, increasing applications of U-Form systems are being found in urban renewal and in third world countries.

Construction and Economic Development. A Case Study and International Comparisons of Productivity
Aug. '75, 106 pp. English
PB-243 846/3 PC A06/MF A01

The relationship of construction and aggregate economic activity is the subject of this study. It discusses the role the construction industry plays in the growth of a developing country, and analyzes the demand characteristics of construction based on econometric equations, interindustry relationships, employment, and earnings.

Development of Improved Design Criteria For Low-Rise Buildings in Developing Countries to Better Resist the Effects of Extreme Winds, Proceedings of a Workshop Held at the Dr. Paulino J. Garcia Memorial Hall, National Science Development Board, Manila, Philippines, November 14-17, 1973
Oct. '74, 169 pp. English
COM-74-51061 MF A01

A 1973 international workshop held in Manila, Philippines, addressed the state-of-the-art in reducing building damages from winds. This report presents the proceedings of the workshop, including recommendations, the workshop program, five reports, and nine technical articles.
Paper copy available from GPO (Government Printing Office) code C13.29/2:56.

A Preliminary Investigation of the Potential Use of Foam Plastics For Housing in Underdeveloped Areas
Feb. '63, 102 pp. English
PB-206 799 PC A06/MF A01

The report describes a study of the feasibility of using foam plastics for low-cost housing in developing countries. The advantages of foam plastics, the important physical properties, present structural applications, and potential housing uses of the materials are reviewed. The mechanical properties of foam plastics are discussed from the point of view of structural engineering, production methods, and erection techniques. A number of structures are illustrated.

Hand Dug Wells and Their Construction
1977, 226 pp. English
PB-297 373/3 MF A01

Technology suitable for exploiting ground-water sources at low cost with minimum sophisticated technology and with the greatest input of village labor and skills is presented. The technologies combine traditional principles with modern techniques. The report is divided into five parts: organization and preparation of well-sinking work; a description of the actual construction of a particular size and type well successful in many parts of the world; alternative materials and techniques; a description of the standard equipment and materials used, and miscellaneous information on well sinking.
(AVAILABLE IN MICROFICHE ONLY)

Simplified Housing Construction Systems For Rural Poor Families
Jan. '73, 241 pp. English
PB-227 616/0 PC A11/MF A01

The volume is designed to teach rural inhabitants simple construction techniques using readily available low-cost or no-cost building materials. Construction techniques requiring very little time and skill are emphasized.

Bamboo as a Building Material
June '67, 58 pp. English
PB-188 921 PC A04/MF A01

Contents: parts of a house for which bamboo is suitable; bamboo reinforcement of concrete; geographical distribution of bamboo; differences among species; some bamboo used in housing; shortcomings of bamboo and how to overcome them; preservation; skill requirements; tool requirements; differentiation and evaluation of species; collecting specimens for identification.

Roofing in Developing Countries. Research For New Technologies
1974, 85 pp. English
PB-234 503/1 PC A05/MF A01

Because of the ever-increasing need for new housing created by expanding populations and the periodic large-scale loss of housing from natural disaster, more than 80 developing countries suffer from acute housing shortages. This report presents conclusions and recommendations concerning areas of research and kinds of materials for the development of new roofing technologies. Ten appendixes address various technical aspects of potential new roofing technologies.

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Rural-Urban Population Projections for Kenya, and Implications for Development.
Text in English
PB80-168370 PC E04/MF E04

On Energy and Agriculture: From Hunting-Gathering to Landless Farming.
Text in English
PB80-168438 PC E02/MF E02

Simulation of Macreconomic Scenarios to Assess the Energy Demand for India (SIMA)
Text in English
PB80-168990 PC E03/MF E02

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Architectural Research on Structural Potential of Foam Plastics For Housing in Underdeveloped Areas
Nov. '65, 295 pp. English
PB-206 969 PC A13/MF A01

This report describes a research program exploring the structural potential of foam plastics as structural materials for housing in underdeveloped areas. It reviews plastics from the standpoint of physical properties, raw materials resources, production, and marketing, and gives a detailed description of a structural investigation of foam plastics. A number of demonstration structures are analytically described.

Handbook For Building Homes of Earth
1970, 161 pp. English
PB-179 327 PC A08/MF A01

Also available in **Spanish** as: Manual Para la Construccion de Casas de Tierra
PB-292 747/3 PM A07/MF A01

Contents: introduction—types of earth houses; soils and what can be done with them; soil stabilizers; site preparation, foundations; lightweight roofs; getting the soil prepared; making adobe blocks; making pressed earth blocks; making walls of pressed blocks; making walls of rammed earth; roofs for earth houses; floors for earth houses; surface coatings.

RURAL HEALTH CARE

Health Care and Human Dignity—A Subjective Look at Community-Based Rural Health Programs in Latin America
Sept. '76, 27 pp. English
PB-292 936/2 PC A03/MF A01

The paper looks at health care programs in rural communities and explores ways of implementing a regional or national approach to rural health care that is community supportive.

Guidebook For Family Planning Education
Dec. '73, 95 pp. English
HRP-0013242/3 PC A05/MF A01

Guidelines for designing and improving educational components of family planning programs are presented in a manual directed toward a person responsible for the educational services of a family planning program. Methods and techniques for assisting couples in developing positive attitudes and behavior in regard to family planning are discussed. The manual, which is intended as a general framework for planning, provides direction in charting an educational plan and in taking the first steps toward implementing the plan. Lists of references are provided throughout the manual, and selected sources for family planning information (films, slides, tapes, catalogs, materials list, periodicals) are listed.

The State-of-the-Art of Delivering Low Cost Health Services in Developing Countries: A Summary Study of 180 Health Projects
Jan. '77, 118 pp. English
PB-270 038/3 PC A06/MF A01

Contents: project characteristics, activities and obstacles; health manpower training and utilization; the delivery of health services; the promotion of health—education, organizations, and the environment; project planning and management; evaluation; innovations in the delivery of low-cost health services.

Guide For the Organization of Health Services in Rural Areas and the Utilization of Auxiliary Personnel
1975, 72 pp. English
HRP-0016123/2 PC A04/MF A01

The overall objective of the two multidisciplinary working groups of the Pan American Health Organization was to develop a methodology for planning, organizing, and controlling programs in order to extend the coverage of health programs in rural areas. This report discusses a proposal for the extension of health service coverage to rural areas and identifies functions and training requirements for auxiliary personnel working in rural areas. The infrastructure of the rural health program is detailed, with emphasis on planning, organization, execution, control, and supervision. A list of references is provided.

Health Needs and Health Services in Rural Ghana. Volume 1
June '78, 296 pp. English
PB-294 568/1 PC A13/MF A01

This volume reports on research performed on three main areas in the health sector: the development of health service appropriate to the needs of the disadvantaged groups in developing countries, particularly in the rural areas; community organization for health activities; and aid in the health sector.

Community Health Education in Developing Countries
1978, 195 pp. English
PB-295 953/4 PC A09/MF A01

The pamphlet was developed for those interested in promoting change to improve the health conditions of their communities. The manual is a guide to help one get started on a community health project through health education.

Appropriate Technology For Health Directory
Apr. '78, 51 pp. English
PB-297 077/0 PC A04/MF A01

The directory contains the names and addresses of people involved in the field of appropriate technology health. A subject index is included.

Some Health Sector Analysis Methods For Developing Nations
May '74, 185 pp. English
HRP-0013245/6 PC A09/MF A01

Quantitative methods and techniques for health planning and management in developing nations are described in this manual. Application of health sector analysis techniques is described at the national, regional, single facility, and single program level. It discusses the constraints in using quantitative methods and techniques; describes program budgeting applications; and gives examples of cost-effectiveness analysis for cholera and malaria. Forecasting and operations research techniques are described at the health program management level. Examples are presented of methods for identifying data, organizing data into information, and analyzing and managing information in decisionmaking. Supporting data, graphs, flow diagrams, and a bibliography are included.

Practical Suggestions For Family Planning Education
1975, 101 pp. English
HRP-0009927/5 PC A06/MF A01

Educational activities within a family planning program are discussed, and techniques for developing a family planning education program are suggested. Also discussed are the goals and objectives of an educational plan. A checklist is provided for evaluating family planning education programs. A model is described for the development of contraceptive educational materials. A bibliography of family planning materials is provided.

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APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

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Washington, D.C. in cooperation with
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an agency of the U.S. Department of Commerce

Dear Friend,

The USAID/NTIS Technical Information Network was established to facilitate access to United States Technology by Developing Countries. AMTID is one method we use to announce documents available from NTIS. The publications listed in AMTID are selected for their relevance and transferability to developing countries throughout the world.

This issue of AMTID gives special attention to Natural Resource Development by listing publications dealing with Natural Resource Planning and Management, Conservation, Science and Technology, and Natural Resource Policies and Programs. Also included in this issue are publications concerning Mining Industries, Agriculture, information on Arid and Semi-Arid Land, and interesting, new titles which have been entered into the NTIS database.

Sincerely,

Annette Tuebner

Annette Tuebner
AMTID Editor

NATURAL RESOURCE DEVELOPMENT

The Role of the Agency for International Development in the Field of Natural Resources Planning and Management
Apr '72, 153 pp. English
PB-210 105 PC A08/MF A01

The report is one of the results of a Workshop on Natural Resource Planning and Management which was held in January 1972 at Washington, D.C. It describes the key issues, significant observations, and major findings and conclusions which emerged from that session, as well as from documentation presented by United States technical agencies and multilateral institutions. Subjects covered include: significance of natural resources to economic growth; constraints on natural resources development; current role of governments, development assistance agencies, and private industry; special capabilities of the United States for international assistance; activities and perspectives of United States technical agencies and international development institutions.

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Basic Materials Industries: Aspects of Technology Choice and Industrial Location
Sept. '78, 31 pp. English
PB80-153141 PC A03/MF A01

This report discusses the interaction of technology-choice with the locational pattern of basic materials industries. The development of an optimal technological structure is described, and the choice of plant level amongst alternative technological options is considered. Reference is made to various sectors of current interest in advancing technological progress in developing countries in the context of broadbased radbased industrialization and a balanced socio-economic development approach.

International Forum on Appropriate Industrial Technology held at New Delhi/Anand, India on November 20-30, 1978. Choice of Appropriate Packaging Technology PC A03/MF A01
Oct. '78, 47 pp. English
PB80-147788 MF A01

The report discusses the role of packaging, use of indigenous materials as a basis for growth, packaging for domestic and export trade, transport, packaging research and training, packaging as a system, appropriate technology, planning for packaging, international cooperation, and the role of international agencies. Appendices include information involving packaging of agricultural products, cement, light engineering products, textiles, drugs, and capital goods.

Teaching Conservation in Developing Nations
1977, 262 pp. English
PB-292 856/2 PC A12/MF A01

The goal of conservation education is to lead the public through a series of steps about nature, land and natural resources which include: awareness, understanding, respect, responsibility, and action. This manual provides ideas, activities and resources for incorporating conservation education into day-to-day community activities. It is structured around a local center which can be used to present an on-going conservation education program by means of pictures and posters, exhibits and collections, films and discussion.

Appropriate Technology for Natural Resources Development: An Overview, Annotated Bibliography, and a Guide to Sources of Information
1977, 174 pp. English
PB-279 193/7 PC A08/MF A01

The purpose of this paper is to acquaint the interested reader with Intermediate Technology (IT). A guide to sources of information (i.e. indices, journals, and practicing organizations) on Appropriate and/or Intermediate Technology is included, and a brief history of the development of IT is given. Examples of IT in developing countries are presented in order to familiarize the reader with the magnitude of applications. The question, Is Intermediate Technology Appropriate, is also discussed.

Natural Products for Sri Lanka's Future. Report of a Workshop Held at Colombo, Sri Lanka, on 2-6 June, 1975

1975, 61 pp. English
PB-251 520/3 **PC A04/MF A01**

This final report is the product of a workshop jointly sponsored by the National Science Council of Sri Lanka (Ceylon) and the National Academy of Science of the United States. The purpose of the workshop was to identify scientifically sound projects that use natural products, that are realistic for Sri Lanka, and that can significantly contribute to the nation's economic and scientific development. This report presents a number of suggestions for improvement of ongoing programs, for marshalling latent resources and for experimenting with new food and export crops. Suggestions and recommendations are also presented.

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Land Use Problems and Research Needs in the High-Altitude Zone of Ecuador

Oct. '75, 47 pp. English
PB-249 288/2 **PC A03/MF A01**

The objectives of the study were: to evaluate the nature and extent of problems associated with use of the high altitude lands of Ecuador; to assess the significance of these problems and the possibilities of solving them through research and/or other types of projects; to analyze priorities and capabilities of various institutions involved in natural resource development and management; and to outline a program for solution of land use problems and identify those areas in which cooperation with external institutions is needed.

An Economic Evaluation of the Utility of ERTS Data for Developing Countries. Volume I

Aug. '74, 101 pp. English
PB-236 600/3 **PC A06/MF A01**

This study reviewed and evaluated the utilization of ERTS-1 data in 18 developing countries. This overall assessment is supported by more detailed economic evaluations in four selected countries: Bolivia, Thailand, Kenya and Botswana. Two quantitative economic evaluations were conducted, one on the benefits to be derived from improved rice-crop forecasting in Thailand, and the other on benefits stemming from improved range-carrying-capacity estimations in Kenya. Additional qualitative evaluations were made of potential improvements in mineral exploration (principally in Bolivia and Botswana), water resources management (mainly in the Mekong Basin and the Okavango Delta), and cartographic mapping. It was found that these benefits can be accrued at low cost levels, provided that appropriately timed and scaled technical assistance is provided.

The Natural Resource Potential for Regional Development of Limon Province: A Preliminary Survey

Oct. '73, 162 pp. English
PB-226 621/1 **PC A08/MF A01**

The study is part of a larger study to understand the appropriate role of science and technology in the development of a small country like Costa Rica. The Limon survey can be described as a broad brush survey of the natural resources existing in the region. It necessitated gathering data relevant to the survey, evaluating the data, and suggesting studies for formulating policies for regional development.

Polices for the Application of Science and Technology to Development

May '73, 108 pp. English
PB-226 279/8 **PC A06/MF A01**

The four principal papers of this report were commissioned for a 1973 symposium on United States Bilateral Aid Strategies and Programs in Science and Technology. The papers discuss policy problems which are important to national development, such as: Science policy as an organizing principle for government action; Natural resources and international aid; Development of science and engineering education in Colombia; and Transfer and adaptation of technology in the construction industry.

Polices and Programs in selected Areas of Science and Technology

Mar. '73, 31 pp. English
PB-218 816/7 **PCA03/MF A01**

The report describes the major components of an Agency for International Development program to assist developing countries with selected aspects of the problem of technological transfer and adaptation. It focuses on: helping developing countries develop national policies and institutions which permit them to make better technological choices, particularly in industry; natural resources assessment and management; and reducing public investment costs.

A Report on the LIPI-NAS Workshop on Natural Resources. Volume I. Overall Findings and Recommendations-Working Group Reports
1972, 81 pp. English
PB-217 293/0 PC A05/MF A01

The purpose of the Workshop was to formulate recommendations on how to utilize the natural resources of Indonesia, taking into account the needs and rising expectations of a growing population. Specific objetives were: to suggest policies and procedures for strengthening the integrated planning and utilization of natural resources; to suggest scientific and technological inputs; and to provide a forum for a coordinated and constructive exchange of views by key scientists, policy-makers, and administrators. Part I of the Report considers problems and major recommendations. Sectoral recommendations are given in Part II.

MINING INDUSTRY

Report of Private Investment Survey Team. Brazil
Dec. '67, 214 pp. English
PB-206 973 PC A10/MF A01

The report is comprised of the findings of an investment survey of the state of Ceara (Brazil), which was conducted in conjuntion with the Companhia do Desenvolvimento de Ceara (CODEC). Economic recommendations are made with respect to transportation, electric power, communications, water, sanitation, irrigation, money and finance, taxation, education and training, agriculture and agro-industry, manufacturing, mining and minerals, and lumber and forestry. The establishment of an economic information center is outlined, and recommendations are made for an analytical and information-gathering system for feasibility studies. In addition, basic information is provided on Ceara for those not familiar with the State.

A Preliminary Study of the Consequences of Deep Ocean Mining Technology Transfer
Dec. '78, 105 pp. English
PB-300 723/4 PCA06/MF A01

The report discusses the transfer of United States and other developed country deep ocean mining (DOM) technologies to developing countries. The report provides a description of the relevant DOM technology, sources of innovation, and methods of proprietary protection. Functional requirements for viable technology transfer are developed and used as a basis for the definition of alternative levels of programs and implementation approaches. The consequences of these technology transfer options on the various parties are investigated.

Estudio Técnico-Economico para la Fabricación de Cal en Honduras (Technical-Economical Study of the Production of Lime in Honduras)
1956, 43 pp. Spanish
PB-296 721/4 PC A03/MF A01

The study examines the development of lime production in Honduras, along with its traditional and possible future uses. Included in the report are: a design for a limestone plant using available fuel to the best advantage; and comments upon the most desirable location of such a plant in relation to the availability of limestone deposits, fuel sources, and marketing. In addition, construction layout and a model for an efficient lime kiln is provided. Analysis of different sources of limestone, operating cost efficiency, local markets, estimated consumption, and export analyses are discussed.

Minerals Yearbook, 1973. Volume III. Area Reports: International Bureau of Mines
May '76, 1164 pp. English
PB-254 165/4 PC A22/MF A01

This report presents statistics for more than 150 countries and areas, and discusses the importance of minerals to the economies of these nations. A separate chapter reviews minerals in the world economy.

Science, Technology and Development. Volume II. Natural Resources, Minerals and Mining, Mapping and Geodetic Control
1962, 362 pp. English
PB-208 432 PC A16/MF A01

This volume includes the following papers: Government as a dynamic agent in mineral resource development; The role of national geological surveys in mineral resources development; The importance of a central mines bureau in fostering development of mineral resources; Legislative choices in the development of mineral resources; Development organization and operation of the Institute in Chile; Opportunities for regional organization in mineral resources development; A cooperative program in Pakistan; In-service and university training of geologists and mineral engineers; Nonmetallic mineral resources for fertilizers; and Regional heavy-mineral reconnaissance for ore deposits in deeply weathered areas with semi-humid to humid and temperate to tropical climate.

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Water Supply and Drainage in Buildings

This report contains information on the following subjects: Water requirements and - procedures for estimating the demand for water in buildings' Protecting water quality in buildings; Water and water related conservation in buildings; Hydraulics of gravity drainage systems; Performance concepts for water supply and drainage sys - tems in buildings; Alternative concepts for transporting and treating wastes within buildings; CIB W-62 purpose methodology, and fields of work; Standardization structure in Europe; Certification and agreement system in Europe; Research laboratories with CIB interest; Cost benefit of plumbing- Large fringe benefits for sanitary installations by thorough analysis of systems; Economic water supply designs - based on performance requirements; Production, transport and use of hot water; Performance requirements for taps -A consensus from Scandinavia; Code structure and standardization in the United States; Potential savings from using reduced-size venting in the United States.

English
PB 80-101470 PC A11/MF A01

INFORMATION ON ARID AND SEMI-ARID LAND

Desertification: Process, Problems, Perspectives. Papers Presented During a 14-Week Seminar Series, November 1975-April 1976
Sept. '76, 134 pp. English
PB80-163553 PC A07/MF A01

This report contains a series of papers addressing the process of desertification from the view point of the generalist. It addresses the problems of reversing desertification, consequences of desertification, ecology of desertification, effects of desertification on land degradation and water resources, and the interrelationship between vegetation, erosion, and stream flows.

Reforestation in Arid Lands
1977, 244 pp. English
PB-292 857/0 PC A11/MF A01

This manual presents current examples of forestry programs in West Africa, based upon the collective experiences of foresters, local farmers and herders. Many of the problems of reforestation of dry areas are the same worldwide. Presented in the manual are methods and planning guides which can be of great benefit in the arid areas of the world.

International Consultation on Ipil-Ipil Research
Jan. '78, 164 pp. English
PB-280 161/1 PC A08/MF A01

Discoveries on the multi-uses of ipil-ipil (Leucaena spp.) generated worldwide interest in the production of this versatile plant. Participants from the United States, Mexico, Australia and Taiwan merged their expertise, experiences and ideas with Filipino scientists in an effort to: put together all available information of ipil-ipil; identify international potentials of the plant for forage, wood and reforestation purposes; and formulate priority research areas and action to fully realize the potentials of the plant. The main objectives of the publication of the proceedings is to provide a reference for scientists and development workers in countries where ipil-ipil is or could be grown.

Arid Lands of Sub-Saharan Africa
1975, 286 pp. English
PB-245 595/4 PC A13/MF A01

This report is based on analysis and integration of ideas from a large number of proposals for development and aid to the nations of the Sahel. A survey and a critique are made of plans for development in the following areas: communication, transportation, dryland crop production, irrigated crop production, livestock and range production, technological and industrial developments, socio-cultural and health developments, and institutional, policy, and economic structural development.

Expansion des Ressources en Eau dans les Zones Arides, Tecniques Prometteuses et Possibilités de Recherches (Expansion of Water Resources in Arid Regions. Promising Techniques and Opportunities for Research)
1977, 165 pp. French
PB-274 612/2 PC A08/MF A01

Little known but promising technologies for the use and conservation of scarce water supplies in arid areas are the subject of this report. Each technology is presented in a separate chapter and arranged under the following topics: methods, advantages, limitations, state of development, needed research and development, selected readings (a short list of review and general articles) and contacts (a list of individuals or organizations involved in relevant research).

Impact of Groundwater Development in Arid Lands: a Literature Review and Annotated Bibliography
1977, 153 pp. English
PB-276 908/1 PC A08/MF A01

As groundwater comes increasingly under development, it is imperative, for economic, ecological, and political reasons, to anticipate the impact of its development. This report reviews groundwater development and its impact in arid lands in terms of physical environment impacts, and socioeconomic impacts. Two case studies are presented: one focuses on the impact of groundwater on the Papago Indians; the second, through a discussion of groundwater development in Pakistan, demonstrates the role groundwater development can play in the economic development process in developing arid countries.

INFORMATION ON RURAL ELECTRIFICATION

SCIENCE, TECHNOLOGY AND DEVELOPMENT. VOLUME I. NATURAL RESOURCES. ENERGY, WATER, RIVER BASIN DEVELOPMENT.

The document is volume one of a twelve volume series containing papers of - United States origin which were submitted at a conference on the Application of Science and Technology for the Benefit of Less Developed Areas in - Geneva, Switzerland. It includes papers on the following subject matters: Electrical distribution grid design and construction for rural areas; the REA program and the role of rural electric cooperatives; TVA's experience with a power utilization program for rural areas; Some problems in initiating a power supply in less developed areas; Rural electrification and rural development; Typical problems in the development of modern power supply in less developed areas; Practical application of coal mining technology; Metallurgical, domestic and industrial utilization of low-rank coals; Auxiliary injected blast furnace fuels; Financing oil expansion; and Economics and design of smaller petroleum refineries.

Other volumes cover such subjects: Agriculture (PB 207-496; PC A12/MFA01) Industrial Development (PB207-497; PC A09/MF A01) and Social Problems of Development and Urbanization (PB 207-500; PC A05/MF A01).

1962-381 pp English
PB-207 495 PC A17/MF A01

Guayule: An Alternative Source of Natural Rubber
Mar. '77, 91 pp. English
PB-264 170/2 PC A05/MF A01

The report describes a little-known bush that grows wild in the deserts of North America and produces a rubber virtually identical with that from the rubber tree.

Bituminous Bases and Surfacings for Low-Cost Roads in the Tropics
1977, 45 pp. English
PB-276 757/2 PC A03/MF A01

Mechanically stable materials for road bases are often not obtainable in developing countries; therefore, the technique of soil stabilization has been developed. In the Middle East, for example, where aggregates are often scarce but oil products are readily available, the region has provided some of the earliest examples of bituminous stabilization which originally consisted of thin running surfaces over compacted sand. Because bituminous stabilization can also enable local sand to be used for base construction, various tests and design criteria have been proposed for such applications. This report describes full-scale experimental trials of bitumen-stabilized sand bases for light/medium traffic. Construction methods for bituminous stabilization are also described. Details are given of methods of surface dressing, which is important both as an initial running surface on new bases, and as a maintenance treatment.

Land Preparation and Crop Establishment for Rainfed Lowland Rice
Nov. '78, 28 pp. English
PB80-163470 PC A03/MF A01

The traditional rainfed rice land preparation transplanting system and alternative new systems of land preparation and crop establishment are reviewed. These latter systems may become economically feasible as a consequence of new rice technology. The report cites major advantages of wet land tillage in the reduction of draft requirements, weed control, ease of transplanting, lessened soil fertility, and reduced percolation losses. Disadvantages of soil tillage discussed in the study include increased late-season drought risk, high transplanting labor requirements, and power unit size limitations. The report also reviews forms of dryland tillage.

Improving Farm Production in Tropical and Sub-Tropical Regions of Limited Rainfall
June '73, 28 pp. English
PB-293 921/3 PC A03/MF A01

The report describes farming systems that aid in making the most effective use of available moisture in developing countries that have limited annual precipitation.

AGRICULTURE

The Conversion of Agricultural By-Products to Sugars
Aug. '78, 112 pp. English
PB80-123474 PC A06/MF A01

Progress in developing an improved method of hydrolyzing xylans is discussed in this report. The identities and properties of the xylanese enzyme family, a hemicellulose present in many agricultural residues composed of the sugar xylose and smaller fractions of other sugars, are described and experimental methods and materials, results, discussions, and references are included.

Protein Concentrate from High-Protein Pearl Millet
Mar. '80, 10 pp. English
PB80-188766 PC A02/MF A01

Procedures are described for obtaining about 80 percent of the high-grade protein in pearl millet grain as a concentrate. These procedures involve extraction of lipid-free whole millet flour with a combination of aqueous isopropyl alcohol, aqueous sodium hydroxide, and dilute mineral acid to give three protein-rich fractions which can be combined for optimum use as a protein concentrate.

Studying the Feasibility of Automatic Poultry Handling and Transfer Technique in the Poultry Processing Industry
May. '79, 67 pp. English
PB80-106412 PC A04/MF A01

A project to determine the state-of-the-art in U.S. poultry processing equipment and to identify functions which could benefit by improved mechanization or automation is reported. Specific handling concepts generated by the study deal with giblet stuffing equipment, a centralized monitoring system, an inventory control system, shackle identification, conveyor designs, hermetic seal applications, and a gamma ray weighing device. New releases describing the project together with numerous tables are included.

A Study of the Caribbean Basin Drought Food Production Problem
May. '79, 222 pp. English
AD-A085 204/6 PC A10/MF A01

The primary objectives of this project include: development of an agrometeorological data base to be used to examine climate and associated large-scale atmospheric systems for possible significant changes related to severe drought; development of a reliable climate/subsistence food production monitoring system to provide early warning of potential subsistence food shortages due to drought in the Caribbean Basin; and examination of hypothesized microclimatic changes and possible increased likelihood of drought occuring in Haiti due to soil erosion.

Direct Extraction Process for the Production of a White Defatted Food-Grade Peanut Flour
Dec. '79, 16 pp. English
PB80-191760 PC A02/MF A01

This report discusses the extraction process for obtaining a white, defatted, food-grade peanut flour having high protein solubility that is suitable for human consumption.

Application of Solar Energy to Industrial Drying of Soybeans: Phase III, Performance Evaluation. Final Report
Oct. '79, 284 pp. English
ORO-5122-T1 PC A13/MF A01

A 15-month performance evaluation was conducted on a solar system designed and constructed to augment the industrial drying of soy beans. The plant employs three oil-fired, continous-flow dryers of 3,000 bu/hr each. The solar system consist of 672 Solaron air collectors that temper the airflow into the existing dryers. Since the requirement for energy exceeds the peak solar system capacity, no storage is provided. This report describes the drying process, gives time and cost estimates, and discusses maintenance procedures of the solar system.

Preparation of Protein Concentrates from Whey and Seed Products
Aug. '77, 14 pp. English
PB80-168503 PC A02/MF A01

This report discusses the preparation of stable protein concentrates which are prepared from whey and seed products by a process which mixes the seed product and the whey, adds alkali to the mixture, and separates a juice containing soluble protein and suspended starch and fat. The juice is then treated to precipitate a protein concentrate either by adding acid to pH 5-6 and heating to 85-9C, or by adding acid to pH 3-4 and then adding sodium hexametaphosphate. Patent Number 4,225,629 available from U.S. Patent and Trademark office.

Supplemental Fish Protein as Milk Replacer for Animals
1979, 4 pp. English
PB80-171176 PC A02/MF A01

Biologically extracted supplemental fish protein, has a commercial application as a high protein food source, particularly as a milk replacer for animals. This paper reports results of an investigation modifying a peptic enzyme process, which produces a product that meets the specifications for milk replacers.

OTHER INTERESTING, NEW TITLES

Perceptions of Technology: A Study of the Human Project
May. '79, 106 pp. English
PB80-133648 PC A06/MF A01

This report discusses a rural development project in highland Ecuador, in which the focus was on the cooperative production and use of methane gas (biogas) within the context of the local community and culture. This paper documents the history of the Iluman Methane Gas/Nutrition-Health/Agriculture Project and specifically studies the impact of international development efforts and technological innovation upon a group of rural people. It deals with culturally defined perceptions of technology and the implications of change, taking into perspective the historical and sociocultural factors which determine the world-view of both the indigenous people and the foreign change agents.

L'Entretien de Machines Agricoles (Farm Machinery Care)
1979, 124 pp. French
PB80-113244 PC A06/MF A01

The translation of an English publication entitled 'Machinery Care Project D Units' covers the following: accompanied by photos. Knowledge of parts used in machinery; the importance of screws and bolts, nuts, wrenches, their size, the different size of nails, their different shapes; and gearboxes are described. Diagrams of engines and all mechanical aspects of machinery are also shown. The farm machinery included are: tractors, ploughs, harrows, sprays, cultivators, planters, mowers, choppers, harvesters, threshing machines, cotton gins, cotton pickers, and corn shellers. The different systems of coupling machinery are described. Maintenance instruction for all machinery is also included.

Utilization of: I. Molasses Distillery Stillage. II. Press Mud
May. '79, 21 pp. English
PB80-125719 PC A02/MF A01

This report identifies options that are available for the utilization of molasses distillery stillage and press mud in biomass production.

Perspectives of Balance: A Study of Health Traditions in Iluman, Ecuador
June. '79, 220 pp. English
PB80-133630 PC A10/MF A01

The health perceptions described in this paper reflect the influence of indigenous and introduced medical and religious philosophies, folk customs, and the interaction with modern health care delivery systems. They are representative of a larger worldview, and influence acceptance or rejection of non-indigenous approaches to nutrition and health. It discusses the necessity of incorporating traditional systems with health programs based on modern or scientific models.

REPORTS ON OR FROM NORTH AFRICA

L'Entretient des Canaux de Drainage a Ciel Ouvert (Some Aspects of an Open Drainage Canal and Maintenance Program)
1978, 24 pp. French
PB-287 257 PC A02/MF A01
PB 287 256/2 English

This booklet contains many aspects of a drainage program. Topics discussed include principal causes for the failure of open drainage canals; recent research on the mechanics of open drainage canal maintenance; and the Ahmed Davis shovel. Also included in the booklet are photographs illustrating various open drainage techniques.

Report on Feasibility Study on Reception Facilities for Selected Ports in a Special Area-Mediterranean. Volume III. Reports on the Countries and Ports visited: Libyan Arab Jamahiriya, Malta, Morocco, Spain, Syrian Arab Republic, Tunisia, Turkey, Yugoslavia
Setp. '79, 254 pp. English
PB80-141526 PC A12/MF A01

The report covers a study of 73 ports in the Mediterranean Sea to determine the need for reception facilities for handling oily wastes from ships. The objective of the study was to provide assistance to countries in the Mediterranean Sea to meet the requirements for reception facilities in special areas as prescribed under Regulation 12, Annex I of the 1973 International Convention for the Prevention of Pollution from Ships. This report presents detailed information on ports in Libya, Malta, Morocco, Spain, Syria, Tunisia, Turkey, and Yugoslavia.

Syncrisis —The Dynamics of Health. For an analytic series on the Interactions of Health and Socioeconomic Development. XV— Tunisia
June. '75, 68 pp. English
HRP-0028078 PC A04/MF A01

Relationships between socioeconomic development and health in Tunisia are analyzed. The health environment is evaluated, along with health care system organization and resources, health policies and plans, and the role of foreign assistance. Problem areas and constraints in the country's health sector are summarized. Tables and a bibliography are provided.

A.I.D. Spring Review of Land Reform. Volume III. Land Reform in Algeria, Tunisia, the United Arab Republic
June. '70, 278 pp. English
PB-195 322 PC A13/MF A01

The document on Algeria, Tunisia, and the UAR is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper consists of the following: the situation before reform; the reform program and the effects of the program.

Tunisia: A Country Study
Sept. '78, 341 pp. English
AD-A073 199/2 MF A01

This study views the progress, changes, and problems that have occurred through the second decade of Tunisian Sovereignty. This new study discusses the dominant social, economic, and political aspects of modern Tunisian society in a compact and objective manner. (Available in microfiche copies only). (Paper copy available directly from Government Printing Office. Washington, D.C., 20401.)

Bibliography of Climatic Maps of Tunisia
Dec. '60, 11 pp. English
AD-664 710 PC A02/MF A01

The bibliography has been compiled from sources in the Weather Bureau Library, the Library of Congress and the Department of Agriculture Library. Sources containing climatic maps of Tunisia, of sections of Tunisia, Northwest Africa and North Africa are included, and map scales are recorded.

Tunisia: Sports and Education
May. '67, 31 pp. English
AD-652 731 PC A03/MF A01

The report describes Tunisian government sports policies; attitudes toward and popularity of sports; sports clubs and facilities; a summary of recent sports activities; physical education and games in the school curriculum; and teacher training for physical education.

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AMTID 80-11 **November 1980**

Dear Friend, 9231

We are pleased to inform the International Technical Information Network, that INFOTEC, which has edited AMTID in Spanish since 1978, is now responsible for the English edition, as well. This change of editorship from the United States to another country, reflects the constant effort of USAID to provide the kind of information that will be most useful to developing countries.

INFOTEC (Fondo de Información y Fomento para la Industria) is a nonprofit trust organization whose primary function is to promote industrial development through industrial extension and technical assistance, thus helping Mexican small and medium size businesses and industries to improve their products and services.

Research has been conducted on alternative energy sources, a pertinent subject in all parts of the world. This month's edition of AMTID has a special section on Ocean Thermal Energy Conversion, a topic important to many developing countries with oceanic coastlines. Also listed in this issue are publications covering Forestry, Irrigation, and Water Resources, as well as reports on or from Thailand.

Sincerely,

Sheila Pous

Sheila Pous B.B.A.
AMTID Editor

OCEAN THERMAL ENERGY CONVERSION

Ocean Thermal Energy Conversion (OTEC) Platform Configuration and Integration. Final Report
July '78, 200 pp. English
DOE/ET/4064-1 PC A09/MF A01

Studies leading to the development of conceptual designs for two 400 MW Offshore Thermal Energy Conversion (OTEC) commercial plants are summarized. A detailed overview of the study Final Report, which was completed in June, 1978, is presented. These studies include platform and cold-water pipe (CWP) optimization trade-offs, arrangements, structure, position control, seawater systems, and auxiliary systems. Deployment concepts are discussed followed by specification of cost and schedules for both alternatives.

OTEC Platform Configurations and Integration Study. Volume I. Systems Energineering and Integration. Final Report
Apr. '78, 315 pp. English
DOE/ET/4063-I PC A14/MF A01

The report presents the results of a study conducted for the Department of Energy to assess six generic types of platforms to determine which would be most satisfactory for several potential OTEC sites. These are directional and symmetric types of platforms which operate on the surface, at the interface, and submerged. Electrical transmission of energy by submarine cable is the planned form of energy transmission except in one case where chemical conversion will be used. This study is devoted to the platform (or ocean systems) of the OTEC plant which is chiefly comprised of the hull and structure, the seawater system, the position-control system, and miscellaneous support/assembly systems. (Portions of document are illegible).

Ocean Thermal Energy Conversion (OTEC) Program. Volume 1. Preoperational Ocean Test Platform
Mar. '79, 183 pp. English
DOE/EA-0062 (V.1) PC A 09/MF A01

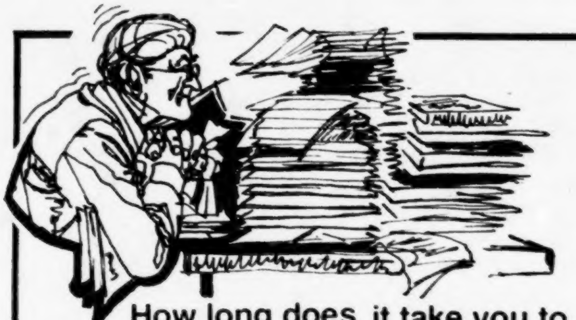
An environmental-impact assesment for the field test of the first preoperational Ocean Thermal Energy conversion, referred to as OTEC-1, is presented. The conceptual design of OTEC-1 is described and the existing environments at the four OTEC-1 study sites are discussed. The environmental impacts considered include organism impingement, organism entrainment, ocean-water mixing, metal-ion release, chlorine release, ammonia leakage, oil release, and platform attraction. The development of a risk assesment model for credible accidents at OTEC-1 is discussed. Also included are: federal and state legal, safety, and health policies pertinent to OTEC-1: and, a glossary.

Ocean Thermal Energy Conversion (OTEC) Program. Volume 2. Preoperational Ocean Test Platform..
Mar. '79, 218 pp. English
DOE/EA-0062 (V. 2) PC A10/MF A01

The supporting data used to prepare an environmental assessment for the OTEC-1 test facility are presented. The candidate sites are characterized and an annotated bibliography is provided for each site. Estimates of the water-discharge-plume and water-suction-plume geometry are given. A summary of the calculations used to evaluate the water-intake and discharge-impact field is provided. An annotated bibliography of OTEC literature is also included.

Systems Descriptions and Engineering Cost for Solar-Related Technologies. Volume VII. Ocean Thermal Energy Conversion (OTEC)
June '77, 133 pp. English
MTR-7485 (V. 7) PC A07/MF A01

This ocean thermal energy conversion (OTEC) study projects the capital cost of the technology through the end of the century. The projection is based on a generic design involving a spar-buoy hull, a titanium heat exchanger, and a fiber-reinforced plastic cold-water pipe. This design was used as the base for estimating power and delivered-energy costs for Southeastern United States, Puerto Rico, and Hawaii.



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Comparison of Nutrient Data from Four Potential OTEC Sites
June '79, 8 pp. English
LBL-9052 PC A02/MF A01

This report provides an in-progress assessment of nutrient-chemical data (phosphate, nitrate, nitrite, and silicate) from four potential OTEC sites (Puerto Rico, Gulf of Mexico, Hawaii, and the South Atlantic). The purpose of the study is to discern seasonal variations that show an influx of nutrient-rich water.

An Evaluation of Oceanographic and Socio-economic Aspects of a Nearshore Ocean Thermal Energy Conversion Pilot Plant in Subtropical Hawaiian Waters. Brief Summary
1975, 10 pp. English
PB80-127145 PC A02/MF A01

Study results of the nearshore application for ocean thermal-energy conversion (OTEC) pilot-plant studies in subtropical Hawaiian waters are summarized. A three-part oceanographic and socioeconomic study completed at Keahole Point, Kona coast, consisted of an extensive literature survey and a field program to characterize the local, physical, chemical, geological, and biological enviroments. An evaluation of the potential ocean-environmental impact of a 20 MW pilot plant located at or just off Keahole Point in the local subtropical waters was also made.

Studies of Biofouling in Ocean Thermal Energy Conversion Plants
1977, 10 pp. English
COO-4041-T5 PC A02/MF A01

This is a report on experiments being done to eliminate the problem of biofouling in simulated heat-exchanger tubes under OTEC conditions. The apparatus and methods being used are briefly described and the conditions of the experiments are discussed in detail. The results of the analysis of the first series of experiments are also presented and discussed. All available preliminary results from the second series are also presented.

Ocean Thermal Energy Conversion: Resource, Ecological, and Environmental Studies.
Mar. '76,102 pp. English
PB-269 283/8 PC A06/MF A01

Ocean areas around the North American continent where thermal structure is favorable for operation of Ocean Thermal Energy Conversion (OTEC) plants are mapped in this report. Information is provided on severe storms accompanied by high winds and wave conditions, as well as ocean-current patterns characteristic of these areas.

Ocean Thermal Energy Conversion:Resource, Ecological and Environmental Studies. Quarterly Report No. 3 (Interim). Thermal-Profile Envelopes and Cross-Sections for Potential OTEC Plant Sites.
Feb '76, 37 pp. English
PB-266 704/6 PC A03/MF A01

This report is devoted to thermal-profile envelopes and thermal cross-sections in regions that have been indicated by previous work as being among the most promising sites for Ocean Thermal Energy Conversion (OTEC) plants. The three U.S.-controlled regions that show promise as sites for prototype OTEC installations are the Gulf Stream, Hawaiian Islands, and Puerto Rico. The environmental considerations of these sites are ocean-temperature differences, current structure, and storm-damage potential.

Assessing Technology for Marine Resource Development. Proceedings of a Conference Workshop Held by the Marine Technology Society at Arlington, Virginia on May 15-17, 1972
May '74, 97 pp English
COM 74-11005/7 PC A05/MF A01

This is a report on documents presented in a workshop on marine-resource development. It covers: technology assessment, its purpose, methods, and scope; a historical review and forecast; environmental protection; an oceanographic program for education and research; criteria for corporate investment; the role of the government, and technology reassessment and reassurance.

FORESTRY

Forestry Activities and Deforestation Problems in Developing Countries
June '80, 199 pp. English
PB80-221 757 PC A09/MF A01

This report summarizes recently completed, current, and proposed forestry activities in developing countries. Included are ecological impacts of these activities, constraints in implementation of projects, and some examples of success and failure to be used to design a strategy to deal with developing country deforestation problems.

The World's Tropical Forests: A Policy, Strategy, and Program for the United States
May '80, 63 pp. English
PB80-221 740 PC A04/MF A01

The world's tropical forests are in danger, and serious social, economic, and environmental deforestation costs hurt rural populations in tropical developing countries. Part I of this report describes the character and importance of forest resources and the causes and consequences of forest cover loss. Part II discusses the prospects for mounting an effective international attack on deforestation. Part III suggests an appropriate response to international forestry needs and opportunities.

Renewable Resources for Industrial Materials
Sept. '76, 280 pp. English
PB-257 357/4 PC A13/MF A01

The concept of the Reference Materials System (RMS) is used as a framework for material assessment and, more specifically, to address the substitution of renewable materials for nonrenewables in particular end uses. The orderly and rational development of national goals for renewable resources requires the evaluation of alternative materials-supply systems in terms of: resource supply; available technology; and, energy, manpower, and capital requirements.

Biological Productivity of Renewable Resources Used as Industrial Materials
1976, 112 pp. English
PB-264 457/3 PC A06/MF A 01

This report estimates the biological productivity of industrial renewable resources in terms of current yields, existing land bases, and increments to these bases that may reasonably be forecast by 1985 and 2000. The forecast is divided into two parts: the silvicultural product of wood; and, products for industry from agriculture. The energy requirements and environmental impacts associated with the implementation of the recommendations on these renewable resources are considered.

Forestry in Developing Countries. Potentials, Constraints, and Opportunities
Oct. '72,76 pp. English
PB-212 726 PC A05/MF A01

This analysis focuses on the following issues: principal factors inhibiting better management of forest resources practical steps that might overcome such problems; and the likely impact on timber resources and their utilization when these steps are taken.

Forestry Cooperative Demonstration Program.
Mar. '73, 47 pp. English
COM-73-10343 PC A03/MF A01

A forestry-cooperative demonstration project and a business-development project are described in this report. The potential for a state-wide landowners' association is explored, and rural development and activities are discussed, with emphasis on cooperatives.

Utilization of Tropical Forests. (A Review of the Forestry Literature in the Agency for International Development Reference Center)
Nov. '73, 31 pp. English
PB-229 822/2 PC A03/MF A01

Forestry reports, publications, and other documents in the AID Reference Center are reviewed to determine what information is available on utilization problems of secondary-tree species in the developing countries. A span of 27 years, beginning in 1946, is covered. The report identifies forestry and land-use problems and examines measures recommended for upgrading forestry programs and improving utilization of unused and little-used species.

Interaction of Wood Species in Different Types of Forests
1972, 339 pp. English
TT-70-57224 PC A15/MF A01

Theoretical principles of the interaction of wood species in different types of forest are incorporated in this book which also makes recommendations on cultivating high-productive plantations of economically important species. The relation of wood species with environmental conditions is examined and the advantages of mixed plantations over pure plantations is discussed. The methods of investigation and ways of controlling the interactions of the wood species are also considered.

Leaf Decomposition in a Tropical Rainforest Stream
1975, 48 pp. English
TID-27205 PC A03/MF A01

Fungi play an important part in leaf-litter decomposition in terrestrial ecosystems in both temperate and tropical regions. There are few published reports dealing with decomposition in running waters, and no work has been done on tropical streams. Results of a study to determine the nature and time course of disappearance of submerged leaf litter in a small stream of a forest in northwestern Puerto Rico are reported. The decompositional activity of aquatic hyphomocytes is emphasized.

A Review of Certain Aspects of the Forestry Program and Organization in Indonesia
Apr. '71, 62 pp. English
PB-211 882 PC A04/MF A01

Indonesia's forestry resources are one of its most valued assets. This report reviews timber operations there, identifies problem areas, and offers a series of recommended solutions. Emphasis is on: organization of the Directorate General of Forestry; use of forest lands, particularly with respect to the granting of timber concessions; the forestry research program; and, environmental considerations.

Weight and Energy Values of Selected Litter-Fall Components from Two Forest Stands in the Canal Zone, Republic of Panama.
1970, 127 pp. English
AD-715 871 PC A07/MF A01

In this study, weights of selected plant parts and species composing litter fall in two forest stands in the Canal Zone were measured. Seasonal values were computed for kilograms and kilocalories per hectare.

International Forum on Appropriate Industrial Technology. Held at New Delhi/Anand, India on November 20-30, 1978. Forest Industry Policy and Choice of Appropriate Technology.
Sept. '78 164 pp. English
PB-294 599/6 PC A08/MF A01

The purpose of this paper is to study how the government in a less-developed country can influence the choice of appropriate technology in its forest-products industry. The overall global structure of some subsectors of the forest-products industry is also considered.

IRRIGATION

Micro Irrigation with Photovoltaics
Apr. '78, 22 pp. English
MIT-EL-78-006 PC A02/MF A01

One application of photovoltaics to irrigation-water pumping is identified and analyzed in regard to the case of the small farmer with 1 to 2 hectares of irrigable land and water available for pumping lift of under 5 meters. This application depends on resolution of the difficulty of financing capital investments for farmers currently operating at subsistence levels or below.

A Wind Energy Review: Low-Cost Machines for Agricultural and Rural Applications
1978, 11 pp. English
PB-297 858/3 PC A02/MF A01

Small-scale irrigation appears to be the most effective use of wind energy in the Third World. Several wind-powered water-pumping systems of an intermediate-technology level are reviewed and sources of further information are presented.

Quick Bibliography Series-Drip Irrigation, 1970-1977
Apr. '78, 32 pp. English
PB-294 000/5 PC A03/MF A01

This bibliography contains 265 citations on drip irrigation covering the period 1970-1977.

Some Aspects of an Open Drainage Canal and Maintenance Program
1978, 18 pp. English
PB-287 256/2 PC A02/MF A01

This booklet covers many aspects of a drainage program. Topics discussed include: principal cause for the failure of open drainage canals; recent research on the mechanics of open drainage-canal maintenace and the Ahmed Davis shovel. Photographs depicting various techniques are also provided.

Economic Aspects of Irrigation from Ground Water
1972, 23 pp. English
PB-219 711 PC A02/MF A01

Examples of economic analysis of ground-water development in Brazil are discussed with specific data for Bolivian conditions cited. Typical irrigation systems were selected, designs developed, and costs estimated. Irrigation costs were also analyzed.

Water-Measurement Procedures Irrigation Operator's Workshop
Sept. '70, 59 pp. English
PB-195 275 PC A04/MF A01

This is primarily a teaching aid presenting the fundamentals of water measurement to field personnel engaged in irrigation work. Factors affecting the accuracy of measurement and commonly used devices and methods are discussed. Hints are given for trouble-shooting poorly operating devices, as well as suggestions to the operator on how to do a good job. A selected reading list for operators is also provided.

Aspectos de la Producción Agropecuaria de Centroamérica en el Marco de la Integración Económica (Aspects of Central American Farming Production within the Framework of Economic Integration)
19[illegible]7, 91 pp. Spanish
PB-289 983/9 PC A05/MF A01

This publication contains three reports on: potential for specialization in the farming areas of Central American countries; the farming subsector in Central America; and, regional cooperation for the development of Central American forest resources. The publication's purpose is to pinpoint certain problems common to two or more of the countries which might be resolved to a certain extent through mutual cooperation.

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Wind Power for Farms, Homes, and Small Industries.

Sep.'78, 229 pp. Text in English

Information is provided on: basic wind-turbine energy conversion; wind behavior and site selection; power and energy requirements; components of a wind-energy conversion system; selecting a wind-energy conversion system and system economics; and, legal aspects.

RFP-2841/1270/78/4 PC A11/MF A01

Irrigation-Principles and Practices for Peace Corps Volunteers
Mar. '76, 116 pp. English
PB-262 747/9 PC A06/MF A01

Contents: Irrigation principles; Water Measurement; Irrigation Water Control; Drainage; Irrigation Planning and Special Information Related to Irrigated Crop Production and Relevant Problems; Explanation for Irrigation Implements; Plans for Animal-Drawn Implements Useful in Field Preparation for Irrigation.

Salinity Problems in Arid-Lands Irrigation: A Literature Review and Selected Bibliography. Information Paper No. 1
1972, 311 pp. English
PB-214 172/9 PC A14/MF A01

This bibliography contains annotated references on such topics as: water quality and the total drainage basin; salinity prevention and soil reclamation; salinity and drought effects on plants; soil and water salts; basic water-balance problems in relation to irrigation; and, an overview on historic salinity and its problems. Consideration is also given to socioeconomic aspects; currently used techniques and potencial ameliorative techniques that render current methods more efficient; raising productivity enough to constitute a breakthrough, and high-humidity low water-use greenhouse structures that would radically alter current arid-land irrigation methods.

Wastewater Use of the Production of Food and Fiber—Proceedings
June '74, 590 pp. English
PB-245 176/3 PC A25/MF A01

An interdisciplinary group met to review the present scientific knowledge base related to benefits and constraints in the use of wastewaters for food and fiber production. Twenty-seven papers were presented by representatives for the fields of public health, engineering, agriculture, aquaculture, and other allied scientific disciplines.

A Mass Balance Study of Recycling Secondary Municipal Wastewater on Abandoned Field Ecosystems
July '78, 57 pp. English
PB-286 275/3 PC A04/MF A01

This is a report of an experiment on the management of a municipal wastewater-land application system using abandoned fields on a 10-year-old oilfield site on thirty-six 0.07 hectare plots arranged within six experimental blocks. Recommendations and conclusions are presented and vegetation response and plant species interaction are discussed.

La Prevention Contre les Moustiques dans les Terres Irriguées (Mosquito Prevention on Irrigated Farms)

1969, 47 pp. French
PB-286 429/6 PC A03/MF A01

This book deals with the principal techniques of mosquito control. The nature and extent of the problem and its socioeconomic and public health aspects are discussed. The biology and habitat of the mosquito are studied together with issues reconciling mosquito control with other targets, such as irrigation, rice growing, and aquaculture.

Engineering Measures for Control of Schistosomiasis

Sept. '70, 71 pp. English
PB-211 473 PC A04/MF A01

Schistosomiasis (or bilharziasis), a water-related disease, affects more people today than ever before in history. Its increasing incidence and widespread prevalence are due in large measure to tropical irrigation and hydroelectric projects. This report provides background information on schistosomiasis and its control in order to enable engineers to work effectively with other professionals on the design and operating of schistosomiasis-control programs. The present status of engineering measures for schistosomiasis control is summarized and some possible approaches and opportunities for more effective control of the disease by engineers are outlined. A bibliography is included.

Water Requirements of Sugarcane Under Irrigation in Lajas Valley, Puerto Rico

July, '70, 42 pp English
PB-197 992 PC A03/MF A01

Field experiments were conducted in Puerto Rico, at Las Lajas Substation to determine optimum soil-moisture conditions necessary to produce maximum sugarcane and sugar yields. Twenty irrigation regimens were tested.

MAKE USE OF THIS NEW WATER SANITATION TECHNOLOGY

Guidelines for Development of Water/Sanitation Components of Urban Fringe and Rural-Village Projects in Developing Countries. Volume I. Patents, Proprietary Processes, and Methods Specific to Water Supply, Waste Disposal, and Sanitation. Volume II.

Dec.'79, 132 pp. Text in English

This two volume publication was prepared to assist those responsible for helping people to gain access to, and benefit from a safe water supply and improved sanitation facilities. Vol. I is a review of the relevant literature on urban and rural water supplies and sewage systems and of experience in the use of various technologies and methodologies in providing these services. Vol. II. covers the effective use of patents and proprietary processes and methods and describes how they might be made more accessible to developing countries.

PB 80-183569 PC A07/MF A01

Identification of Return Irrigation Water in the Subsurface: Water Quality

Oct. '69, 92 pp English
PB-189 171 PC A05/MF A01

This study investigates the physical and chemical characteristics of irrigation return water in Pearl Harbor-Waipahu, Oahu, an area used for tropical agriculture. Stream waters in the main study area were to contain appreciable quantities of nitrate, phosphate, bromide, bicarbonate, and flouride. Well waters from the main study area were evaluated according to Visher and Mink's index constituents, silica, sulfate, nitrate, and other significant ionic compositions. General analysis of major constituents indicates a cyclical trend in concentration related to seasonal rainfall, irrigation practices, or both.

Agricultural Benefits and Environmental Changes Resulting from the Use of Digested Sewage Sludge on Field Crops

1971, 73 pp. English
PB-213 537/5 PC A04/MF A01

This project considers the agricultural benefits and environmental changes that would result from applying digested sewage sludge liquid to field crops and develops criteria for selecting sites for this method of sludge disposal.

Irrigation in Bangladesh

Feb. '78, 24 pp. English
PB-294 546/7 PC A02/MF A01

This is a summary of a more extensive paper on irrigation in Bangladesh which suggests that the development of irrigation is a precondition for a significant increase in agricultural output and employment.

Secondary Benefits and Irrigation Project Planning

May '63, 37 pp. English
PB-297 086/1 PC A03/MF A01

This report presents conclusions on a study which researched an irrigation project in Jefferson County, Oregon. Its purpose is to state the principal theoretical issues and to present measures for obtaining secondary benefits.

Surface-Water Resources of the Yobe River System, Northern Nigeria, 1963-68

Jan. '69, 206 pp. English
PB-210 594 PC A10/MF A01

This report describes the general hydrologic features of the Yobe drainage basin and presents hydrologic data on gauge heights, daily discharge, and analysis of chemical quality and sediment content of water samples for 18 stations in the system.

Towards a Marine Policy in Latin America

Oct. '77 63 pp English
PB 275 245/9 PC A04/MF A01

This report stresses the need in Latin America for considering the ocean as an integral part of their development. Comprehensive national ocean policies should be adopted and marine ecosystems and their development strategies should be evaluated.

Irrigation on Western Farms

July, '59, 60 pp. English
PB80-169923 PC A04/MF A01

This booklet will aid the farmer in understanding the soil profile and soil properties important to irrigation. Soil moisture and crop growth, and topography and drainage are explained as are the means to determine how to analyze one's own farm. The principle methods of irrigation discussed are: border irrigation, level border and basin irrigation, contour-ditch irrigation, furrow irrigation, corrugation irrigation, sprinkler irrigation, and subirrigation. Other problems concerning irrigation are also discussed.

WATER RESOURCES

Indexed Bibliography of Publications on Water and Waste Engineering for Developing Countries

June '77, 56 pp. English
PB-292 887/7 **PC A04/MF A01**

This bibliography is intended primarily for those working in or preparing projects for developing countries. The term "water engineering" covers water resources and hydrology, with emphasis on community water supply. "Waste engineering" includes solid waste as well as wastewater. The document also contains references to irrigation and environmental aspects of hydroelectric schemes.

Micro-Level Approaches for Improving Water Resource Knowledge Transfer in Rural Areas
June '77, 18 pp. English
AD-A044 982/7 **PC A02/MF A01**

This report summarizes the topic discussed at the Second International Conference on the Transfer of Water Resources Knowledge in the context of regional development. Six papers were presented covering a broad range of issues, from a diagnostic description of a difficult situation in rural India to a theoretical approach to the policy decisions relevant to rural modernization. Special attention is given to two key points: resistance to change on the part of farming communities at lower levels of technological sophistication and attempts to overcome such resistance.

Regional Workshop on Water Resources. Environment and National Development. Volume I. Summary of Proceedings. Singapore, March 13-17, 1972
Mar. '72, 120 pp. English
PB-217 117/1 PC A06/MF A01

This report summarizes the proceedings of a workshop held in Singapore whose main purpose was to focus attention on current problems of water resources and the environment confronting the countries of the Southeast Asia region and to stimulate regional cooperation in seeking solutions.

The Environmental Impact of a Large Tropical Reservoir: Guidelines for Policy and Planning. Based upon a Case Study of Lake Volta, Ghana in 1973 and 1974
1974, 97 pp. English
PB-247 430/2 **PC A05/MF A01**

This report summarizes all possible ecological and related physical environmental impacts of tropical dams and man-made lakes within a framework appropriate for the needs of the impact-assessment procedure. Data requirements and alternative methodologies (research, survey, inventory, evaluation, monitoring) are given to assist in the design of the assessment study.

Environmenal Aspects of a Large Tropical Reservoir- A Case Study of Volta Lake, Ghana
Sept. '74, 360 pp. English
PB[illegible]48 630/6 **PC A16/MF A01**

The purpose of this study was to formulate guidelines for orienting future development in order to prevent costly and avoidable environmental impacts. The case-study approach was chosen because of the proven advantages of obtaining detailed understanding of specific development. The Volta Lake was selected for the case study because of the opportunity it offered to review the environmental impacts of impounding a tropical river.

The Continued Development and Field Evaluation of the AID Hand Operated Water Pump
Aug. '70, 42 pp. English
PB-196 340 **PC A03/MF A01**

Based on several years' research on the development of a simple, efficient, hand-operated piston pump for use in developing countries, this document covers plunger-valve design, selection of optimum cup material, and the evaluation of cylinder coatings, foot valves, and handle pins and bushings.

Water Quality Standards and International Development
Oct. '71, 34 pp. English
PB-204 408 **PC A03/MF A01**

Progress to date in establishing water-quality standards in the United States and the developing countries is summarized in this report. Its purpose is to assist those concerned broadly with environmental policies in developing countries to obtain a better understanding of past efforts and future needs in this field.

REPORTS ON OR FROM THAILAND

International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on 20-30 November 1978. Food Storage and Processing in Thailand.
Oct. '78, 22 pp English
PB-299 255/13 **PC A02/MF A01**

Agricultural crops, fish and meat, which provide the basic materials for food processing in Thailand are discussed. Special emphasis is given to the fruit canning industry which is dominated by the production of pineapples. The pineapple canning process is presented with a commentary on future technological development of the canning industry in Thailand.

Urban Food Supply and Distribution: Characteristics and Utilization of Fresh Food Markets in Bangkok and Thonburi
Feb. '74, 127 pp. English
AD-A038 482/6 **PC A07/MF A01**

This report deals with one aspect of the problem of food supply and distribution to urban areas. Indicators of change within the market system are identified along with market responsiveness in meeting the changing needs of a rapidly growing urban population.

Aquaculture as an Integral Part of the Agricultural Farming System. A Case Study in the Northeast of Thailand
July, '75, 15 pp. English
PB-263 672/8 **PC A02/MF A01**

This study discusses the possibilities of small-scale aquaculture for achieving diversification, increased cash income, improved quantity and quality of food produced for home consumption and exploitation of unutilized resources currently available to small farmers. It points out that aquaculture is a naturally integrated part of the agricultural system involving small farmers on a wide scale.

The Buffalo as a Draft Animal in Thailand
Oct. '79, 36 pp. English
PB80-154651 **PC A03/MF A01**

The greater efficiency of the buffalo as a draft animal with the use of an improved harness (which can be made with local materials in tropical regions) is explained and demonstrated. A questionnaire on buffalo production and use is included.

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APPLICATION OF MODERN TECHNOLOGY TO INTERNATIONAL DEVELOPMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. in cooperation with the
National Technical Information Service (NTIS)
an agency of the U.S. Department of Commerce

AMTID 80-12 **December 1980**

TEXTILE INDUSTRY

Appropriate Technology in India. Report of a Study Leave, August-December, 1977
1977, 51 pp. English
PB-294 759/6ST **PC A04/MF A01**

This booklet is a study of small-scale industries in India and Nepal and of efforts to develop appropriate technologies for the establishment of decentralized industries in rural areas. It is a ready reference for specialists who may be interested in certain technologies. Emphasis is on the advantages of each technology and the opportunities for their application, with special reference to the problems of the rural poor. The topics covered are: textiles; engineering; cement-making; craft industries; chemical processes; renewable energy; ecology; and nonmechanized transport.

Manual de Instrumentación y Control de Calidad en la Industria Textil (Manual for Instrumentation and Quality control in the Textile Industry)
1978, 57 pp. Spanish
PB-298 451/6ST **PC A04/MF A01**

General aspects of textile testing are discussed with emphasis on problems caused by the humidity of test samples. The importance of atmospheric control in testing laboratories is stressed and methods to carry out mass and humidity measurements and preliminary treatment of textile samples are given. Guidelines for the consistent testing of textiles and for quality control are included, as well as methods to measure fiber torsion and traction. The mechanical, physical, chemical, and physiochemical properties of fibers, threads and fabrics are discussed together with testing methods for each. Properties of textile floor coverings are considered and functions to be performed by chemical and physiochemical pilot plants are outlined. Three appendices are included on: instrumentation needed by factories and textile labs for testing; suppliers of such instrumentation in several countries; and selection of appropriate units and magnitudes recommended for the measurement of textile properties.

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in the Textile Industry of Sri Lanka
Sept. '78, 24 pp. English
PB80-159304 **PC A02/MF A01**

Background on the textile industry in Sri Lanka is presented. Aspects of the need for a textile industry are explained and appropriate technologies in the textile industry cited.

9231

Dear Friend:

This month's AMTID bulletin covers the textile industry and provides information on leather tanneries, cattle production and reports on or from Brazil. The information helps to meet the basic needs of many developing countries.

Although the textile industry has traditionally depended on the solution of unskilled labor within the handcraft areas; there have been important technological developments which affect it. Documents in this issue cover some of them.

The reports on leather tanneries contain information on the possibilities of reversing the ever increasing price of such products. The articles on cattle production relate to the optimal utilization of cattle products and subproducts, thereby helping to ease the world famine.

Sincerely,

Sheila Pous

Sheila Pous B.B.A.
AMTID Editor

A Search for an Appropriate Technology for Decentralized Cotton-Spinning Industry in Rural India
Nov. '77, 53 pp. English
PB-294 416/3ST **PC A04/MF A01**

This paper describes the development of a small-scale spinning unit in India and discusses the measures needed to operate this industry. It grew out of the attempt to improve the Khadi hand-spinning technology when it became evident that it was at an economic standstill. A 432 spinning unit was developed which can produce 20-count yarn of quality acceptable to the cottage weaver, at a competitive price. This unit has great potential for further technical development to improve the quality and range of yarn that can be spun.

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Textile Industries
Sept. '78, 63 pp. English
PB80-154289 **PC A04/MF A01**

The topics included in this report are: world textile capacity; the Indian textile industry; problems common to developing countries; comparison of processes (spinning, weaving, and textile mill); case study for transfer of appropriate technology; decentralized sector of the textile industry-case study India; trends in the international textile industry; and an outline of industrial policy for developing countries.

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Dualism and Technological Harmony for Balanced Development.
Oct. '78, 72 pp. English
PB80-154271 **PC A04/MF A01**

This paper explores the possibilities of a two-tier industrial development pattern in the Third World and the role technology should play in it. Such development is aimed at reducing the dualism of population outside the modern sector. The prospects of semiurban industrialization in textiles are considered.

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Production of Cotton Cloth
Sept. '78, 32 pp. English
PB80-152911 PC A03/MF A01

This three-part document discusses: world production and trade in textiles and textile machinery; textile production; and the results of economic evaluation and policy conclusions to be drawn from these. African conditions are given particular emphasis.

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International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Technologies from Developing Countries (A Preliminary Compilation)
Oct. '78, 260 pp. Englis
PB80-154628 PC A12/MF A01

This paper contains information on technologies developed in certain sectors of developing countries which are available from sources there. The sectors covered are: chemicals and metal working; drugs and pharmaceuticals; textiles; cement and building materials; food storage and processing; agricultural machinery and implements; light engineering and rural workshops; oil and fats; paper products and small pulp mills; energy for rural requirements; and, low-cost transport for rural areas. Only products or processes available for introduction on a commercial scale have been included.

International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Textiles
Oct. '78, 17 pp. English
PB80-146798 PC A02/MF A01

The textile industry in developing countries is discussed in this report along with a review of alternative technologies. Decentralized spinning, areas of research and development, technology of finishing, and policy implications are considered.

Appropriate Technology for Cotton-Yarn Spinning on Cottage Basis in Rural Areas
Oct. '78, 55 pp. English
PB80-125701 PC A04/MF A01

The report includes detailed descriptions on the working of machinery and equipment, expected performance, cost of machinery and installations, wages and income avaiblable to workers, economies in work, etc., in the cotton-yarn spinning industry. It can help developing countries set up either the prespinning and spinning part of the technology as well as support existing hand-loom weaving or combined spinning-weaving.

Plant Requirements for Manufacture of Terry Cloth
May '59, 37 pp. English
PB-177 924 PC A03 /MF A01

The production of single-loop terry cloth in a mill of minimum economic size is considered in this manual inasmuch as it is a type of textile that has many applications in good volume. Its various uses includes towelling, wash cloths, robes, bath mats, bathing suits or sunsuits, linings for suits and coats, draperies, spreads, bedrolls and potholders. This cotton fabric may be made with loops on one or both sides.

Men's Work Shirts. Capital Requirements, Techniques, and Operations
1961, 76 pp. English
PB-177 915 PC A05/MF A01

This report contains the basic information to be considered before embarking on the manufacture of inexpensive work shirts. Being a highly competitive industry, efficient methods and equipment must be used. The well-defined and comparatively simple processes are described and the necessary machinery indicated which is readily available at a reasonable cost.

Plant Requirements for Manufacture of Cotton Dresses
Apr. '59, 40 pp. English
PB-175 539 PC A03/MF A01

This manual describes a cotton-dress factory that falls within the small– to medium-size category. In this type of plant, high productivity makes it possible to manufacture stylish, simple dresses that retail at a low price, despite rising costs of materials and labor. The processes are designed to be as efficient as posible, since the cotton-dress industry in the United States is one of the most competitive businesses in the country.

Plant Requirements for Manufacture of Jute Yarn
Oct. '61, 33 pp. English
PB-292 958/6ST PC A03/MF A01

The purpose of the report is to present basic information for setting up a manufacturing plant in a foreign country to produce jute yarn. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment, and supplies, as well as data on engineering, training, safety, markets, sales, and financial and economic factors.

Plant Requirements for Manufacture of Crochet and Knitting Yarns
1961, 34 pp. English
PB-292 675/6ST PC A03/MF A01

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce crochet and knitting yarns. It includes brief information and cost estimates on labor, machinery, equipment, and supplies, as well as data on engineering, training, safety, markets, sales, and financial and economic factors.

Plant Requirements for Manufacture of Standard Sport Stockings
Mar. '62, 34 pp. English
PB-292 802/6ST PC A03/MF A01

Basic information for establishing and operating a small plant in a foreign country for the manufacture of men's stocking to be used by baseball and soccer players is presented. All stockings of this type are knitted. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations require expert engineering and financial advice to meet specific local conditions.

Vegetable Fibers and Their Uses (Les Fibres Végétales et Leurs Utilisations)
1966, 37 pp. French
PB-294 419/7 PC A03/MF A01

The processing and use of vegetable fibers are summarized in this paper with special emphasis on the development of this type of manufacturing for inclusion in the small-industry sector in various countries. The paper covers as well, the equipment to be used during the stages of production until the final product is obtained.

Vegetable Fibers and Their Uses
1966, 26 pp. English
PB-294 420/5ST PC A03/MF A01

The processing and use of vegetable fibers is summarized with special emphasis on the development of this industry in the small-scale industrial sector of various countries. Several subjects relating to vegetable fibers, from the processing to the manufacturing phases, are covered.

State of the Art of Textile Waste Treatment
Feb. '71, 356 pp. English
PB-212 359 PC A16/MF A01

This report considers waste-treatment methods and practices used in the textile industry. Information obtained from people working in the industry was supplemented from a review of the literature of which an annotated bibliography was prepared. The topics covered are: characteristics of textile waste; waste treatment techniques; treatment methods in use; effects of textile wastes on receiving waters; the cost of waste-treatment operations, and, state and federal regulation governing discharge waters. Areas of needed research are also recommended.

NOW AVAILABLE FROM NTIS

International Forum on Appropriate Technology Held at New Delhi/Anand, India on November 20-30, 1978. Evaluation of Appropriate Technology for Textile Production in a Developing Country.

The Textile industry is one of the earliest industries to appear in many developing countries. This paper analyzes the relevance to developing countries of alternative technologies available for various stages of textile manufacture. The scope is restricted to the main apparel fibers, cotton and man-made fibers. The discussion is primarily based on the profile of textile manufacture in India, where a wide range of technologies and scales of operations exist side by side.

Text in English
PB-294 621/8ST PC A05/MF A01

Cotton Boll Rot. Laying Out a Trial of a Method of Control (La Pourrite des Capsules du Cottonier: Essi de Mise en Place d'une Méthode de Lutte)
1975, 152 pp. English
PB-249 731/1 PC A08/MF A01

This study, conducted mainly at Bamberi (Central African Republic), defines the different types of damage suffered by cotton from boll rot which affects 10 to 20 per cent of the crop. It identifies the organisms responsible and their mode of penetration, the obstacles the boll presents to the attack of the parasites, and the principles of a method of control. Growers have been defenseless against this plague.

Reporte Técnico sobre la Industrialización Integral del Pseudo-Tallo de Banano (Technical Report on the Integral Industrialization of the Pseudo-Stem of Banana Trees)
May, '79, 81 pp. Spanish
PB80-171002 PC A05/MF A01

A description is given of the banana tree and areas where it is planted in Ecuador. Methods of utilizing the banana fiber by mechanical processes for the production of textiles, rope, boards, and possibly to obtain starches for nutritional purposes are presented. The document includes photos, descriptions of machinery, and a lengthy bibliography.

CATTLE PRODUCTION

Aspectos de la Producción Agropecuaria de Centroamérica en el Marco de la Integración Económica (Aspects of Central American Farming Production within the Framework of Economic Integration)
1977, 91 pp. Spanish
PB-289 983/9ST PC A05/MF A01

This publication is divided into three reports on Central American farming: potential for specialization; the farming subsector, and regional cooperation for development of forest resources. Between 1974 and 1976, a study was made of the rural farming sectors in Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua, in cooperation with the respective governments. Certain problems common to two or more of the countries which may be solved, up to a certain point, through mutual cooperation are discussed. Increased productivity in cattle- and crop-raising, and hence higher income, depends upon the degree of specialization of the five countries. Efforts are being made to redistribute rural populations to less exploited areas in an attempt to offset differences in soil, erosion, temperature, and rainfall in the various countries. Investment and development programs aimed at projects tending to promote competition are considered as leading to better organization of total resources.

Informe General sobre el Desarrollo Agropecuario y Rural de El Salvador (General Report on Rural and Farming Development of El Salvador)
Dec. '76, 78 pp. Spanish
PB-289 984/7ST PC A05/MF A01

This report summarizes the background and rationale of the principal suggestions and comments of a study to assist the government of El Salvador to examine strategy, policies, programs, and projects for increasing cattle- and crop-rasing production and improving the living standards in rural areas. The following main topics are outlined in the report: national economy in relation to the cattle- and crop-raising sector; trends in production of grain and cattle; socioeconomic factors affecting development; organization of agencies concerned with agriculture; soil resources in relation to production; incentives for agricultural development; and strategy for rural and farming development. Eight technical annexes in two separate volumes provide more detailed discussions of certain aspects of this general report.

A Generalized Simulation Approach to Agricultural Sector Analysis, with Special Reference to Nigeria
Nov '71, 378 pp. English
PB-212 187 PC A17/MF A01

Because of the difficulties and uncertainties involved in solving economic-development problems, researchers have turned to system simulation for making information available to decision-makers on the possible consequences of alternative resource allocations. A simulation study provides a group of time histories, each representing the outputs of a particular set of assumptions, exogenous variables, and policies. Efforts to develop a general simulation approach to agricultural development and requirements for implementation of such a model in developing countries are described in this report.

L'Aménagement de Points d'Eau dans les Pacages (Stock-water Developments: Wells, Springs, and Ponds)
1978, 102 pp. French
PB-293 863/7ST PC A06/MF A01

Various methods for watering livestock under various climatic conditions are explained in this book. The water needs of cattle, sheep, and pigs are charted for herds of varying sizes and the geography of water tables, artesian wells, and other watering holes is explained. Terracing, reservoirs, irrigation, maintenance and care of watering devices are also described.

Ganado Bovino para Carne - Descorne, Castration, Marcación a Hierro, Marcas (Beef Cattle – Dehorning, Castrating, Branding, and Marking)
1968, 20 pp. Spanish
PB-292 766/3ST PC A02/MF A01

Complete and detailed instructions on various methods for dehorning, castrating, branding, and marking cattle are discussed, as well as the neutering of cows. Branding and marking-branding by heat and iron or liquid chemicals and further markings by notching ears and tattoing are explained.

Graphic Analysis: Applications in Agricultural Economics
Nov '66, 82 pp. English
PB-293 822/3ST PC A05/MF A01

This report describes various types of graphic methods for presenting agricultural information. The graphic tool is practically indispensable for preliminary analysis. One of the main ways of learning about these relationships is through graphics.

Preliminary Project Report on Animal By-Products Utilization
1979, 9 pp. English
PB80-187248 PC A02/MF A01

In the city of Madras, India there were many stray dogs which constituted a threat of rabies and of spreading other diseases throughout the city. To combat this problem and, at the same time, dispose of the carcasses of larger animals like cattle and mules, the Municipal Corporation of Madras set up a self-supporting plant to turn the polluting animal carcasses and strays into leather, protein supplement, stock feed, and fertilizer. The report covers the institutional framework, objetives, implementation, and cost of the project.

OUTLINE ON THE MANAGEMENT OF BEEF CATTLE

L'Engraissement et l'Explotation des Bovins de Boucherie. (The Feeding and Management of Beef Cattle).

This booklet outlines what should be considered in the management of a beef herd. The pasture is discussed in the light of climate, vegetation, cultivating forage, season, windbreaks, load per unit area, rodents and rabbits, watering, seasonal pastures, subdividing lots, destroying shrubs, reseeding and exploitation of herbs and shrubs.

Sex, age, weight and quality of the animal, storage of forage, nutritive requirements, rations, hormones, forage preparation and balancing rations are all studied in discussing how to fatten the animal.

Equipment, such as fences, silos, corrals, shades, road grates and back-scratchers, is covered. Dehorning, castration and branding are also discussed.

Text in French
PB-293 864/5ST PC A07/MF A01

The Herringbone Milking System. Economic Appraisal, Labor Efficiency Analysis, and Adjustment Possibilities
Sept. '60, 35 pp. English
PB-293 984/1ST PC A03/MF A01

One of the more important developments which seems to promise greater efficiency in dairy farming is the herringbone milking system which combines well with such advances as loose housing of dairy cows, pipeline milking, and bulk handling of feed and milk, In this report, information on the herringbone milking system has been gathered and analyzed. The herringbone is compared with other milking systems under various farm situations, and its possible impact on dairy farming is considered. The results are of interest to dairy farmers contemplating changes in their milking systems, particularly those thinking of expanding their herds, as well.

Productos Biológicos Veterinarios, Ayudan a Combatir las Enfermedades (Veterinary Biologics - Help Fight Animal Diseases)
1971, 12 pp. Spanish
PB-287 063/2ST PC A02/MF A01

Diseases (hog cholera, tuberculosis in cattle, rabies, black murrain, hepatitis and erysipelas) prevalent in farm animals (cattle, poultry, dogs, cats, rabbits, chinchillas, minks, pigs) and the use of vaccines, antiserums and antitoxins for their control are discussed. Immunizations employing both viral and bacterial vaccines, antitoxins, to neutralize poisonous substances in the animal, and antiserums as defense against disease are discussed with emphasis on seeking competent help in administering these agents.

Plant Requirements for Processing of Dairy Products
May, '62, 102 pp. English
PB-175 527 PC A06/MF A01

The manual, intended primarily to provide a basic understanding of production and marketing, provides information on the processing of milk and other dairy products for human consumption.

INFORMATION ON LEATHER TANNERIES

Good Work Practices for Tannery Workers
Apr. '76, 25 pp English
PB 267 358/0 PC A02/MF A01

This booklet contains occupational health and safety information for tannery workers. Common hazards are identified and safe work practices suggested. Chemicals used in tanning are listed along with safety precautions.

Leather Chemistry for Foremen. First-Year Course
1962, 121 pp. English
PB-177 972 PC A06/MF A01

The contents of this training manual are: Atoms and molecules; Symbols and formulas; Some nonmetallic elements; Chemical reactions; Chemical arithmetic; Metals; Solutions; Ionization; Atomic structure; Introduction-Structural theory; Hydrocarbons and methane series; Alcohols; Aldehydes, ketone, acids, esters; Fats, oils, and waxes; Amines; Carbohydrates; Aromatic amines; Halogen compounds; Dyes and Dyeing.

Tecnología Simplificada de la Producción del Cuero (Simplified Technology of the Production of Leather)
July, '76, 103 pp. Spanish
PB80-170285 PC A06/MF A01

The study presents an improved leather technology covering the curing of hides. The various origins of leather are discussed, and diagrams of the chemical reactions and the most recommended reagents are also included.

Leather Technology
1962, 86 pp. English
PB-177 981 PC A05/MF A01

The contents of this report are: Introduction; Hides and skins; Soaking and unharing; Liming, beaming, and splitting; Acids and alkalies and the pH system of measuring their strength; Tanning; Vegetable tanning; Leather lubrication; Drying and pasting; Dyes and coloring; Economics in the leather industry; Workshop on upper leather; Leather machinery terms.

Plant Requirements for Manufacture of Chrome-Tanned Leather
Sept. '61, 40 pp. Englishh
PB-292 831/5ST PC A03/MF A01

The report presents basic information on establishing a small leather-tanning plant in a foreign country. This plant, with an annual capacity of 185,000 square feet, produces high grade chrome-tanned leather. Answers are given to overseas technical inquiries of factory operation, management, and engineering together with brief data and cost estimates on labor, machinery, equipment and supplies, as well as engineering, training, safety, markets, sales and, financial and economic factors.

Plant Requirements to Set Up and Operate a Leather Tannery
May '59, 45 pp. English
PB-292 803/4ST PC A03/MF A01

Leather tanning can be accomplished by any of the six well-known processes. The two most widely used are the vegetable and chrome methods. Because of the relatively large demand for upper-shoe leather, this manual was developed for processing hides from their raw state to finished upper leather by using the two-bath chrome-tanning process. The projected tannery is capable of processing 16,000 pounds of hides to yield 13,500 square feet of finished upper leather per eight-hour day, utilizing about 56 workers, and is of minimum economic size. Overseas technical inquiries on factory operation, management, and engineering, including brief information and cost estimates on labor, machinery, equipment and supplies, as well as data on engineering, training, safety, markets, sales, financial and economic factors are answered.

Secondary Waste Treatment for a Small Diversified Tannery
Apr. '73, 82 pp. English
PB-221 494/8 PC-GPO/MF A01

This report describes the research conducted by Vanderbilt University on methods of treating tannery wastes for discharge into a small stream. Carried out in conjuntion with a small tannery using primarily alum-tanning as well as some chrome and vegetable tanning, a modified completely-mixed, activated sludge plant was built. After a year's operation, with correction for errors, the plant began to produce effluent that more than met expectations, removing 97 percent of the suspended solids and 95 percent of the BOD. The characteristics of the wastes and the treatment process are discussed.

Prefeasibility Study of an Expanded Leather and Shoe Industry in West Africa to 1980
Jul. '66, 57 pp. English
PB-206 970 PC A04/MF A01

This report answers some of the basic questions on the leather and shoe industry in West Africa with consideration of the markets for these products, current production capabilities, feasible expansion of production to 1980, and the potential importance for the economic development of West Africa. It is considered that cooperative economic-development planning on a basis that includes the entire subregion will result in a more effective pattern that might contribute to a more favorable utilization of African resources and to improvement in living standards.

Cuire et Peau: Depouillement, Salage, Empaquetage (Hides and Skins from Locker Plants and Farms)
1962, 50 pp. French
PB80-148901 PC A03/MF A01

The sale of leather can be a lucrative additon to the income of the farmer who raises livestock for food, if hides are properly prepared. This report describes the preparation of the animals and the proper use of tools for the art of skinning. The type and preparation of salt for tanning and the siting and climate for the tanning facility are covered along with the specific considerations necessary for the various animals. The removal of excess salt from hides, folding and packaging, labeling, shipping, and storage of hides are discussed. Information is also included on judging flaws in hides, parasites, injury, branding live animals, and possible damage during slaughter. The classification of hides by quality and weight for industrial use are also covered.

Small Enterprises in Developing Countries: Case Studies and Conclusions
1979, 111 pp. English
PB-297 369/1ST MF A01

This publication contains more than 20 annotated case studies of problems faced by small businesses in various developing countries. The second part of the book is a general discussion of the factors that determine the success or failure of a small business. Some examples of the areas covered by the case studies are: soap manufacturing, a candy factory, leather works, plastics, fertilizers, roof-tile manufacturing, a wool-spinning center, and a block maker. Only available in microfiche)

Spain's Leather Industry: Prospects for Blue Chrome (Wet-Blue) Processing
May '77, 41 pp English
PB 267 949/6 PC A03/MF A01

The rapid expansion of the Spanish leather-goods in industry, has created a serious pollution problem from tannery effluents. The use of chrome (wet-blue) leather in Spanish tanneries would reduce the pollution caused by cleaning and dehairing of conventional salt-cured hides, as well as the number of workers required in tannery beam-houses, where cleaning is done. In response to a 1976 survey tanners responsible for about 80 percent of Spain's finished-leather output said they would increase imports of blue-chrome leather provided uniform grades and standards could be established to reduce variability of quality. It was estimated that elimination of the beam-house operation might reduce hide-finishing costs by 15 percent, and thus most tanneries would be willing to pay more than 15 percent price premium for wet-blue hides. They also indicated that if pollution lawas were enforced, they would be more willing to substitute blue-chrome for salt-cured hides since that would reduce the beam-house operation.

REPORTS ON OR FROM BRAZIL

Study for Agricultural Engineering Development in Brazil
Aug. '72, 43 pp. English
PB-214 534/0 PC A03/MF A01

This study makes specific recommendations for a long-term program to establish quality education and research in agricultural engineering in Brazil and for obtaining recognition for agricultural engineering as a profession under Brazilian law. The most urgent needs in this field in Brazil are identified and recommendations made on how best to meet them.

Methodology and General Data Description: Farm Level Capital Formation in São Paulo, Brazil
Dec. '71, 44 pp. English
PB-219 725 PC A03/MF A01

This research paper based on an agricultural survey of 383 farms in the state of São Paulo, Brazil considers the capital-formation process with special emphasis on the role of credit and technology in bringing about rapid changes in production and/or productivity. Analyses were made of farm organization, income, consumption, savings, investment, and other distinguishing characteristics to show the production-income-growth process for several homogeneous groups that reflected various farm characteristics.

Economic Aspects of Irrigation from Ground Water
1972, 23 pp. English
PB-219 711 PC A02/MF A01

The adequate use of ground water to produce both irrigation and drainage benefits by providing sufficient moisture properly distributed throughout the growing season is described. Based on typical examples of economic analyses of ground-water development in Brazil, it is considered that production of cotton, sugar cane, soybeans, wheat, forage crops, and others with similar water requirements should be at leased doubled thereby. Irrigation costs are also analyzed.

Small-Scale Industry Grant: Baseline Data-Areas of Brazil Served by Educational Foundation of South Santa Caterina
Jan. '75, 27 pp. English
PB-249 184/3 PC A03/MF A01

This report is made up of a series of tabular displays of data on the area served by the Education Foundation for South Santa Catarina. The data presented include identification of existing industry by classification, size, number of firms, number of employees, and total sales. Detailed information is provided by industrial classification for various cities and population and land area data for centers within the zone serviced by the Foundation.

Farm Ownership, Political Participation, and Other Social Participation in Central Brazil
1968, 22 pp. English
PB-189 818 PC A02/MF A01

From 255 to 289 farmers were studied from the standpoint of the sociological thesis that land ownership is the basis of class distinction and of broad differences in economic and political power. The findings indicate that the present structure of the rural sector results in the virtual exclusion of nonowners from social and political particpation, creating a situaton in which they depend upon the more privileged community members to serve as agents in their relations with the rest of the system, since they do not have an opportunity to effectively manage their own interests in the larger society.

A.I.D. Spring Review of Land Reform. Volume VII. Land Reform in Brazil, Northeast Cuba, Guatemala, Mexico
Jun. '70, 296 pp. English
PB-195 321 PC A13/MF A01

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